

1895

1936



Business Combats Price Control Bill

**Measure Aimed at Chain
Stores May Ban All Forms
of Price Differentials**

By L. W. MOFFETT

Special to AUTOMOTIVE INDUSTRIES

Organized forces waging vigorous contests for and against the Robinson-Patman price discrimination bill staged a "march" on Washington, Wednesday, by 1500 independent merchants demanding its enactment into law. They were given encouragement by the sponsors of the measure, Majority Leader Robinson, of the Senate and Representative Patman. Senator Robinson virtually promised that the measure would be passed by the Senate within two or three weeks. General belief prevails that this will be done. On the other hand, it is thought the bill may be tied up in the House Committee on Judiciary, whose majority is said to be opposed to the legislation on the grounds that it will increase costs to consumers.

Vigorous attack on the bill also has been made by the National Association of Manufacturers. It is also the object of strong opposition by consumer organizations. Reports are current that some of the latter may also stage a "march" on Washington and that if they do, their demonstration will exceed by far that of the independent merchants. While Washington has become rather cool to "marches" of all kinds, it remains a fact that demonstrations by independent merchants are

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Motor Employment Near 1929 Record

**Attained in Spite
of Smaller Volume;
Stability Improved**

Production of automobiles in 1935 gave work to a higher average number of men than any preceding year except one, according to an announcement made this week by the Automobile Manufacturers Association. The employment total for the year, amounting to 438,000 workers, came within 10,000 of equaling the 1929 all-time record.

This level of employment was attained despite the fact that 1935 output of motor vehicles was still a million and a quarter cars below the 1929 mark.

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Motor Vehicles and Safety

**Fales of MIT Finds Much
for Designers to Contribute**

That the accident rate of a new model, which was much more powerful and smoother than its predecessor, had trebled that of the older model was one of many statements made in the interest of safety by Dean A. Fales, associate professor of automotive engineering, Massachusetts Institute of Technology, before a meeting of the Greater New York Safety Conference this week.

Mr. Fales cited the potential safety factor in reserve power, but brought out the fact that few drivers keep an eye on the speedometer. Though everyone knows the inherent danger of the governor, the speaker laid emphasis on the fact that if such means should be adopted, the governor should be regulated in proportion to the car's ability rather than at a standardized speed for all cars.

Body design, with special emphasis on the driver's vision and freedom from fatigue, with many interesting highlights on how these might be accomplished, occupied the greater portion of Mr. Fales' talk.

Reeves Gives Full Support to Highway Safety Program

Full support of the automotive industry for the enforcement program of the American Association of Motor Vehicle Administrators was pledged last Thursday by Alfred Reeves, vice-president and general manager of the Automobile Manufacturers Association. The administrators, in an announcement the

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Higher Schedules Fixed for March

**Better Weather Brought
Impressive Sales Jump
Last Week in February**

By HAROLD E. GRONSETH

The spring selling season for automobiles is off to a good start. Increased retail activity is reported on a wide front as winter relinquished its hold on important market areas. Delivery reports for the final 10 days of February are up 30 per cent to 50 per cent over the second ten-day period and further sharp increases in March are shown by companies receiving weekly reports. The extent of the upswing now under way confirms the opinion of motor executives that a large pent-up demand awaited only a break in the weather to be translated into actual sales.

Starting the last week of the month, the expansion in sales will have an important effect on the February retail volume which up to that time had shown considerable shrinkage from January due to adverse weather conditions. Bolstered by results of the final week, February now stands a good chance of equaling or slightly exceeding the corresponding month of 1935, when passenger car registrations totaled 170,615 and truck registrations 34,797. Actual retail deliveries in January this year totaled 244,000 cars and trucks, but registrations which reflect many year-end sales are expected to run to 262,000 units.

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Goodyear Ordered to Revise Prices

**FTC Hits Sears
Discrimination;
Appeal Planned**

The Federal Trade Commission on Thursday issued an order against the Goodyear Tire and Rubber Co., Akron, Ohio, to cease and desist from alleged discriminating in price between Sears, Roebuck and Co., and Goodyear's retail-dealer customers by selling automobile tires to Sears, Roebuck and Co. at net prices realized by dealers and other purchasers.

In arriving at the realized prices, the order requires Goodyear to "take into account and make due allowance for

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Canadian Sales and Production Up; Outlook for '36 is Bright

Canadian registrations at the end of 1935 totaled 1,161,002 motor vehicles which represents an increase of 3.8 per cent over the preceding year and is only 54,000 units behind the peak year of 1930. A larger number of trucks were on the road last year than at any time in the Dominion's history. Thus has Canada regained a major portion of the loss sustained throughout depreciation years.

Production output for the year totaled 172,934 units, an increase of 48 per cent over the previous year's total of 116,852 units. Imports and exports showed marked improvement, while increased operation was indicated by gasoline sales which, for the first nine months, amounted to 429,834,000 gallons, an increase of 8 per cent over 1934.

Revenue from automobile registration in 1934, the latest for which fig-

ures are available, was \$21,600,000 and from the gasoline tax, \$50,600,000. At the beginning of 1935, 609,642 miles of highway were available for traffic of which 93,642 miles were surfaced. While disbursements for highway construction have dropped since the 1930 peak, expenditures during the past two years have increased as a result of federal and provincial activities for unemployment relief.

Tariff changes and prospective revisions have had a disturbing effect on Canada's protected automotive industry. As a result of the United States-Canada trade agreement, duty on automotive products has been reduced and the United States has been granted equal treatment to that given any non-British nation. Nevertheless, according to reports from the Canadian capitol, the outlook for 1936 is definitely encouraging.

Canadian Registrations

Province	Cars		Trucks & Buses		Total	
	1935	1934	1935	1934	1935	1934
Prince Edward Island	6,453	6,409	797	744	7,250	7,153
New Brunswick	28,164	24,614	4,902	4,332	33,066	28,946
Nova Scotia	35,957	34,443	8,206	7,160	44,163	41,603
Quebec	139,499	135,441	28,130	27,671	167,629	163,112
Ontario	489,610	470,617	69,960	67,160	559,570	537,777
Manitoba	59,500	59,285	10,400	10,555	69,900	69,840
Saskatchewan	75,727	74,050	18,700	17,053	94,427	91,103
*Alberta	73,874	73,444	15,581	15,486	89,455	88,930
British Columbia	77,687	73,997	17,601	16,529	95,288	90,526
Yukon	134	127	120	109	254	236
Total	986,605	952,427	174,397	166,799	1,161,002	1,119,226

Safety Program Proposed by Highway Administrators

Motor vehicle enforcement officers of 43 states, coordinated as the American Association of Motor Vehicle Administrators, have declared open warfare on what they term the lunatic fringe of motorists whom the association holds responsible as a primary cause of the highway traffic problem.

Low Wallace of Iowa president of the association, explained this week a six-point program that has been adopted in the interest of safety, and which depends for its effectiveness on the co-operation of the individual states. The program outlines the following provisions:

1. Formation in each state of a state safety committee with the primary objective of securing support for and coordination between the administrative and enforcement bodies and the courts.
2. Uniform state laws and municipal ordinances brought about by the efforts of various coordinating bodies.
3. Standard operators' requirements with definite power of suspension and revocation and severe penalties for driving while a license is suspended.
4. Education of youth both before

they are eligible to drive and during their early driving years. This would include traffic safety education in the schools.

5. Withdrawal of the fear appeal, with all future drives made along constructive lines.

6. An objective of the association—to offer by the end of the current year a definite uniform proposal acceptable

to the general public. To this cause the association earnestly solicits the aid of all groups interested in the accident problem.

"The suspension and revocation of drivers' licenses," concluded Mr. Wallace, "is the most potent weapon at our disposal." A strong appeal has been made that all states not now having this power take steps to get it at once, in the interest of the great majority of careful motorists.

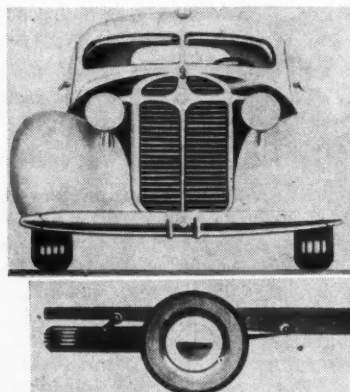
NRA Standards Would Be Revived by Healey

House Bill, Like Walsh Measure, Would Apply to Federal Contracts Only

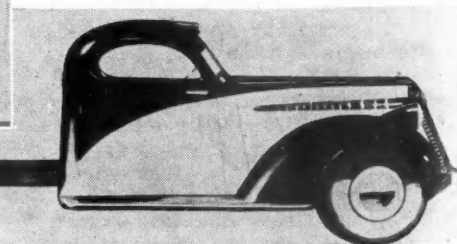
Declaring there have been widespread departures from NRA code standards, Representative Arthur D. Healey, of Massachusetts, on Monday introduced a bill which is a modification of the Walsh Government contracts bill. The Healey measure, administration of which would be under the Department of Labor, would apply to all Federal Government contracts in excess of \$2,000, require adherence to hours and wages standards, bar convict and child labor, and carry the same penalties as those provided in the Walsh bill. The latter passed the Senate at the previous session of Congress but was tied up in the House Committee on Judiciary of which Mr. Healey is a member.

The Healey bill is less complicated than the Walsh bill. Among the important changes is the omission of the requirement that general contractors shall be responsible for adherence to prescribed standards by subcontractors. Instead, general contractors are required only to notify subcontractors that the work and materials are in fulfillment of Federal Government contracts. Also, unlike the Walsh bill, the Healey measure is not made retroactive. The provisions would apply only after passage of the act. Another change is the deletion of the requirement that all contractors engaged on work being done

A NEW TRUCK . . .



designed by Hal Holtom, automotive consultant, Detroit, for a new company whose name and plans are still a secret.



with the use of Government funds live up to the standards. This means that states and other political divisions using Federal funds would have to assume the responsibility of fulfillment of contracts which they award.

Minimum wages and maximum hours would be determined by the Secretary of Labor, provided they "are fairly and reasonably commensurate with the value of the service or class of service rendered."

Chemists to Discuss Motor Fuel Problems

Use of Liquefied Gases and Diesel Fuel Progress Among Subjects on Program

The chemical future of motor fuel will be the theme of a national symposium to be held in connection with the ninety-first meeting of the American Chemical Society, Kansas City, Mo., April 13 to 17.

Prof. George Granger Brown of the department of chemical engineering, University of Michigan, will be the chairman of the sessions, sponsored by the society's divisions of petroleum, gas and fuel, and industrial and engineering chemistry. Several hundred petroleum chemists and scientific and industrial workers in allied fields will participate.

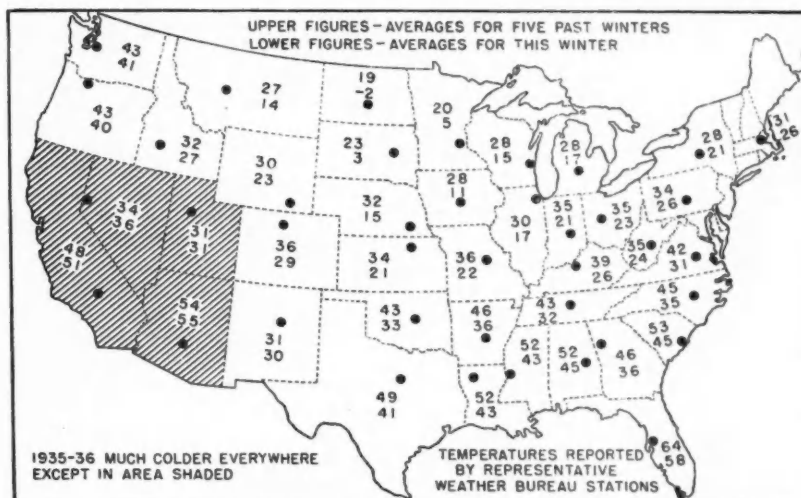
Papers and addresses will disclose new developments in the technology of gasoline, special safeguards to be imposed in the use of liquefied gases as motor fuel, such as propane and butane; progress in the use of Diesel fuel, and the utilization of alcohol to run motors.

"Because of the large demand for liquid motor fuel, there is always an effort to include materials of a wider range of properties among those used as commercial fuel," says the announcement by Professor Brown. "Propane and butane being too volatile to be included in large amounts in ordinary motor fuel, and yet not volatile enough to be satisfactorily handled as a component of natural gas, have in the past been treated largely as waste products.

"During recent years these materials have been successfully employed as motor fuel by transporting the liquefied product under pressure in pressure vessels and vaporizing it only as it is immediately required for fuel by the engine. The latent heat of vaporization is usually furnished by the waste heat from the motor and the gaseous fuel is then mixed with air as required by the engine.

"The metering of the fuel in the gaseous condition can be done much more accurately and efficiently than the usual procedure of metering a liquid fuel into an air stream. Furthermore, propane and butane have very high antiknock value, much higher than other fuels commercially available, so that they can be used with much

The Automobile Industry vs the Weather



Autocar to Recapitalize; This Year's Sales Are Double '35

The Autocar Co. has formulated plans for recapitalization which call for the raising of \$300,000 of new capital by an issue of 10-year debentures. A part of the new capital will be used to make a 20 per cent payment on the first mortgage seven per cent bonds, outstanding in the amount of \$907,000. This payment will be made in consideration of extension of the bonds for 10 years from the present maturity date of May 1, 1937. A substantial number of the bondholders are reported to have given their consent to the extension. The balance of the new fund will be used for working capital.

The company's annual report shows a net loss for 1935 of \$164,812, as compared to a loss in 1934 of \$139,741. But of considerable interest is the fact that Autocar sales for January and February, 1936, are 102 per cent ahead of the corresponding period in 1935, while Studebaker truck sales through Autocar outlets has increased 98 per cent for the same period. Good geographical distribution is noted in the new orders, together with the total absence of extremely large orders. Current assets, according to the company's statement, exceed current liabilities by \$3,273,380.

Prize Packages

Modern Packaging each year selects the most outstanding packages in their All - America Packaging Competition and this year awarded a Silver Medal to the Perfect Circle Co. for their design in the fibre can classification.



Goodyear Deadlock Threatens Akron with General Strike

The tire industry strike situation in Akron continues in a seemingly hopeless deadlock. Leaders of the striking employees and the management of the Goodyear Tire & Rubber Co. appear to have reached an impasse in their efforts to find a common ground upon which to settle the strike at the Goodyear Akron plants which now is in its third week with 15,000 Goodyear workers idle, all Goodyear production suspended and the company's factories barricaded and picketed by hundreds of strikers and strike sympathizers. Meanwhile, the threat of a general strike hangs over Akron in event any attempt shall be made to break through the picket lines and reopen the factories.

In a dramatic session preceding an overflow mass meeting of strikers and strike sympathizers at the Akron Armory, the Central Labor Union set up special machinery for a general strike and placed the power to order a mass walkout of members of more than 100 unions in the city, in the hands of a special Goodyear strike committee.

Edward F. McGrady, assistant Secretary of Labor, left Akron on Tuesday, his proposal for arbitration of the Goodyear strike on a plan similar to that successfully worked out in Toledo last year having been rejected both by the Goodyear management and the United Rubberworkers Union. McGrady went to New York to work on the elevator operators' strike there.

P. W. Litchfield, president of Goodyear, emerged Monday from the barri-

caded factories where he had been "imprisoned" with nearly 1000 office and factory employees since Feb. 17, and established headquarters in the Mayflower Hotel. He reiterated previous pronouncements that Goodyear would refuse to negotiate while the plant was being picketed, and would not sign any agreement with the United Rubberworkers Union of America which took the strike out of its original "outlaw" class and made it official by a sanctioning union vote.

Alma Motor Co. Formed to Make 4-Wheel Drive Units

The Alma Motor Co. has been formed to purchase and operate the Alma Manufacturing Co. of Alma, Mich., makers of four-wheel drive units for conversion of Ford and Chevrolet trucks. Incorporated in Michigan, the new company has authorized capital of 200,000 shares of 6 per cent participating preferred stock, cumulative after Jan. 1, 1937, and 100,000 shares of common stock, each with par value of \$1. Offering will soon be made of the preferred stock.

Detroit S.A.E. Students Hear Talk on Diesel Possibilities

Detroit Section S.A.E. Student Activity, R. N. Janeway, chairman, was addressed this week by Thomas Midgley, father of Ethyl gasoline, and E. T. Vincent of Continental Motors. Mr. Midgley had a brief talk on "Research, Key to the Future," while Mr.

Earnings Statements of Automotive Companies

Vehicle Manufacturers		1935	1934
Autocar Co.		*164,812	*139,741
Hudson Motor Car Co.		548,749	*3,239,201
Other Automotive Companies			
Borg-Warner Corp.		6,982,732	3,750,576
Edward G. Budd Mfg. Co.		743,412	*1,398,833
Budd Wheel Co.		784,444	111,944
Electric Auto-Lite Co.		2,908,797	1,212,135
Federal Screw Works, Inc.		*122,614	*28,956
Link-Belt Co.		1,092,360	869,373
McCord Radiator & Mfg. Co.		250,680	*27,509
Wagner Electric Corp.		835,947	314,330
Miscellaneous			
Cities Service Refining Co.		†*901,071	*1,355,864
Electric Storage Battery Co.		2,247,755	2,004,404
B. F. Goodrich Co.		3,429,781	2,534,679
Pacific Western Oil Corp.		663,533	631,833
Pure Oil Co.		8,150,000	*885,000
Standard Oil Co. of Kansas		131,748	366,780

*—Net loss.

†—Years ended Sept. 30.

Vincent discussed "Diesel Engines: Past, Present and Future."

Mr. Vincent was not very optimistic about seeing the automotive Diesel in general use and in fact rather implied that its use should be confined to heavy-duty vehicles for some time to come. For the future, the most promising design is one incorporating open chamber construction, rather than special auxiliary chamber forms. Future engines must have higher speeds if they are to compete with gasoline engines. Fuel consumption must be still lower and b.m.e.p. must go higher. Finally, the successful Diesel is one which can burn any fuel that's fed to it, rather than depend upon costly special fuels.

Goodyear Ordered to Revise Prices

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differences in the cost of transportation and selling tires to the individual tire dealers on the one hand and Sears, Roebuck and Co. on the other." The order concludes by stating that nothing in it "shall restrict the respondent's liberty to remove the discrimination either by increasing its price to Sears, Roebuck and Co. or by lowering its price to its other customers."

The Goodyear company is directed to file with the commission within 30 days a report stating in detail the manner in which the order will be "complied with and conformed to." The case was one of the most important of the kind ever to come before the commission. The formal complaint was issued under Sec. 2 of the Clayton Anti-Trust Act and was made public Oct. 8, 1933. Voluminous testimony was presented at the numerous hearings.

In its findings the commission said that the gross discrimination in favor of Sears, Roebuck and Co. ranged from 32 to 53 per cent. It also said that the net average sales price discrimination, after deductions from dealer prices for discounts and allowances and transportation, over the entire period since a contract of March 8, 1926, varied from 29 to 40 per cent. The total net discrimination, after making the allowances, was said to amount to approximately \$41,000,000, or about 26 per cent of the aggregate net sales price to independent dealers on a volume of business comparable to that of Sears, Roebuck and Co.

It was also held that Goodyear concealed the prices at which it was selling tires to Sears, Roebuck and Co., from its own sales organization and from the trade generally. The competition which Sears, Roebuck and Co. was thus able to bring into the retail tire market, it was stated, was a major factor in driving out of business a large number of retail tire dealers. It was added that this reduction in the number of independent tire dealers in turn drove out

of business numerous small tire manufacturers.

In a statement following the commission's order, President Litchfield of Goodyear said the case will be appealed.

"Were it permitted to stand," declared Mr. Litchfield, "the decision would wipe out a widely used trade practice under which a substantial proportion of the country's retail business is done."

"In practically every line of merchandising, large distributors, department stores and others are having special brand goods produced for them at quantity discounts by independent manufacturers. Millions of Americans buy from these distributors; thousands of workmen are employed in the manufacture and sale of these products; a great amount of capital investment has been made by stockholders of various industries to provide facilities for this type of production. The practice itself is on trial—not Goodyear."

"Low-cost manufacturers, working in combination with low-cost distributors, have brought low prices in many lines of merchandise. It seems incongruous that a government, professing to stand for the masses of consumers, could undertake to block such an arrangement."

"If the decision should stand it would mean ultimately increasing living costs for millions of consumers; decreases in the volume of commodity sales and, in the case of the tire business, total disruption of the whole price structure with irreparable damage to tire dealers everywhere. Universal application of the principles indicated in the commission's decision would set back the wheels of recovery several years."

Parts Groups Fail to Agree on Show Plans

M.E.W.A. Objects to Make-Up of Committee for Annual Jobber Show

Failure of the three major aftermarket associations to get together to date on plans for a single Automotive Service Industries Show in 1936 leaves the situation, temporarily at least, just as it was immediately after the last show in Atlantic City, when Motor and Equipment Wholesalers Association announced that it would not join with Motor and Equipment Manufacturers Association and National Standard Parts Association in sponsoring another jobber show.

Announcements from both groups indicate that the only obstacle to an accord in a disagreement over representation on the show operating committee and the number of days on which the show shall be closed to all but member jobbers.

In all former shows the joint operating committee has had 12 members—three jobbers from M.E.W.A., three jobbers from N.S.P.A., three manufacturers from N.S.P.A. and three manufacturers from M.E.M.A. M.E.W.A. this year feels that committee representation would be more equitable if each of the sponsoring associations had four representatives on the committee. This would leave it up to the N.S.P.A., which has both manufacturer and jobber members, to decide how it wanted to divide its committee representation.

Up-Town Dealer Goes After Down-Town Business



Thomas B. Martindale, Ford dealer in Philadelphia, with an up-town show-room, decided that the way to get parts and accessory business was to open a store in a district where accessories are sold. So he opened this store where parts and accessories exclusively are sold at retail. No cars are shown.

Business in Brief

Written by the Guaranty Trust Co., New York, exclusively for **AUTOMOTIVE INDUSTRIES**

There was a slight slackening in general business last week. Adverse weather, with heavy snow and floods, continued in many parts of the country. Department store trade in the metropolitan area of New York in the first half of February was 5.3 per cent above that in the corresponding period last year. With few exceptions, commodity markets last week were higher, especially the sugar market. The prospects for real estate are now considered more promising; and considerable activity is expected in this line during March, provided the weather is favorable.

Carloadings Lower

Railway freight loadings during the week ended Feb. 22 totaled 586,712 cars, which marks a decrease of 44,635 cars below those in the preceding week, a gain of 33,547 cars above those a year ago, and a rise of 11,804 cars above those two years ago.

Electric Output Rising

Production of electricity by the electric light and power industry in the United States during the week ended Feb. 22 was 12.3 per cent above that in the corresponding period last year.

Life Insurance Sales Dull

Sales of ordinary life insurance in the United States during January

were 26 per cent below those in the corresponding period last year. This decline, however, is attributed to the fact that sales in January, 1935, were stimulated by the anticipation of generally increased premium rates after that month.

Lumber Production Steady

Production of lumber during the week ended Feb. 15 was 3 per cent below that in the preceding week; new orders were 4 per cent lower, but shipments increased 12 per cent.

Petroleum Output Unchanged

Average daily crude oil production for the week ended Feb. 22 amounted to 2,779,200 bbl., as against 2,774,250 bbl. for the preceding week and 2,536,200 bbl. for a year ago.

Fisher's Index

Professor Fisher's index of wholesale commodity prices for the week ended Feb. 29 stood at 83.3, as compared with 83.8 the week before and 83.4 two weeks before.

Federal Reserve Statement

The consolidated statement of the Federal Reserve banks for the week ended Feb. 26 showed no changes in holdings of discounted bills, Government securities, and bills bought in the open market. Money in circulation increased \$4,000,000, and the monetary gold stock rose \$3,000,000.

UAW Organization Meeting To Be Held at South Bend

A convention of the International Union, United Automobile Workers of America, will be held in South Bend, Ind., April 27, for the purpose of officially and legally terminating the probationary period stipulated last August, electing international officers, formulating and adopting laws and policies as well as other business which may properly come before the meeting. The convention was called by F. J. Dillon, president of the Union, after a conference in Washington with William Green, president of the American Federation of Labor.

"Recently," said Mr. Dillon, "statements have been made to the public press by officers of the International Union, which clearly reflect a lack of understanding of the problems confronting us and a total disregard of the best interests of our people generally. All of these incidents, while making our task more difficult, in no

way will alter the basic policy of our institution.

"The supremacy of the International Union will be preserved and perpetuated. Rights of members will be protected, and responsible officers will be required to conform to the laws and to govern themselves accordingly. Matters of dispute, questions of law and policy will be considered and decided by the convention.

"It will be my purpose as general president immediately to begin the preparation of an exhaustive and complete report of my activities as president and to give an analysis of our difficulties and recommendations to the convention embracing my ideas as to the conduct of the organization's affairs as well as the policy which it should pursue following the adjournment of this convention."

Mr. Dillon said that the U.A.W. general office is now busily engaged in preparation of the official call, together with the issuance of credentials for certified delegates to the conven-

tion. Dillon plans to go to South Bend immediately to arrange for a suitable meeting place and other details, and will then return to Washington for further conference with Mr. Green, who according to Dillon, "is intensely interested in the development and perpetuation of a powerful, practical and useful organization of automobile workers and has given and continues to give much time and thought to this problem."

Automotive Ads Only 5.7% Of Total Newspaper Space

Automotive advertising accounted for only 5.7 per cent of the total 1935 advertising space in 369 metropolitan newspapers, according to a breakdown by Media Records, Inc., as reported in *Editor & Publisher*. The survey covered newspapers in 95 cities where more than ten million advertisements had been placed by over 100,000 advertisers.

The automotive group accounted for approximately 108,600,000 lines as compared with a total of 1,901,000,000 lines. The largest lineage was classified as "Retail" with 1,093,000,000 followed by "General" with 333,000,000 and "Classified" with 300,000,000 lines.

Chevrolet Appoints Used Car Department Officials

The appointment of Frank E. Zorniger as manager of the national used car department, and the enlargement of its staff to carry out the increased activities marking the company's used car merchandising throughout the country, was announced this week by W. E. Holler, vice-president and general sales manager of the Chevrolet Motor Co. David F. Adderhold, who has been Chevrolet city manager at Boston, is the newly appointed assistant used car manager for the eastern half of the United States, and Ray C. Meddaugh, Indianapolis city manager, has been named assistant in charge of the western half of the United States.

40 Years Ago

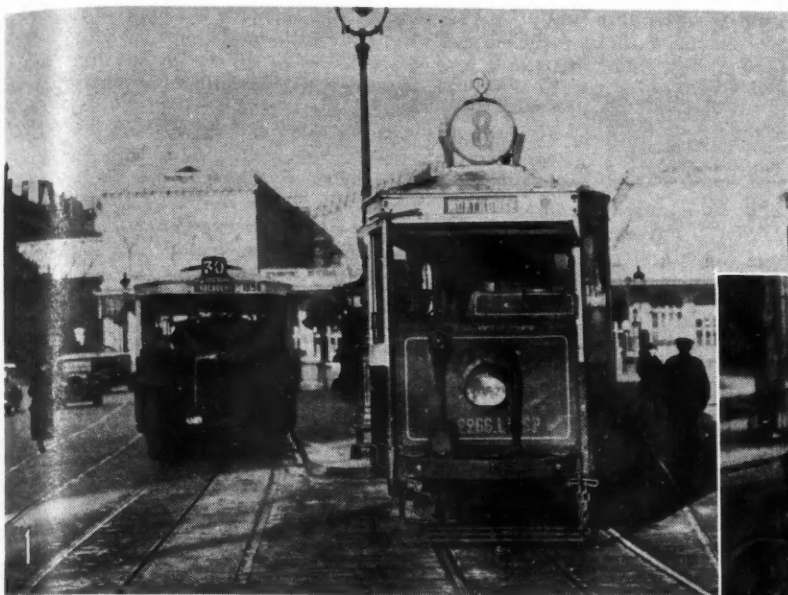
with the ancestors of
AUTOMOTIVE INDUSTRIES

There were more motors at the Sportsmen's Exhibition than at the Cycle Show, but the cycle trade is so busy that it has neither room nor time for outside attractions at present. Next year, though it may be bigger and busier, it will have a few moments to spare for the motorcycle.

Managers of fairs are hot on the trail of the motor wagon this spring. It is likely that quite a number of the new vehicles will be exhibited in this way before snow flies.

—From *The Horseless Age*, March, 1896.

The WORLD on WHEELS

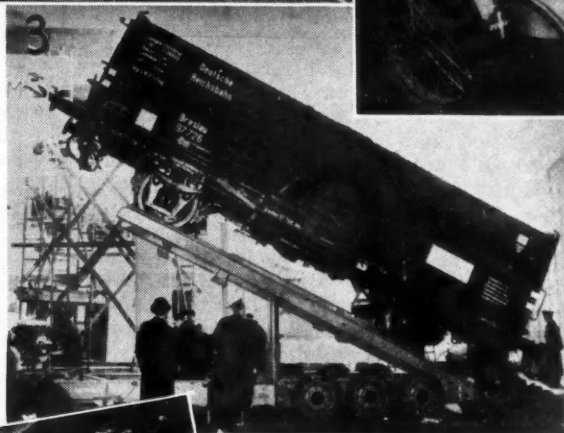


1. Street-cars disappeared from Paris this week when a "Montrouge-Gare de l'Est" car made its last run. The surface public transport system of the French capital is now entirely motorized.

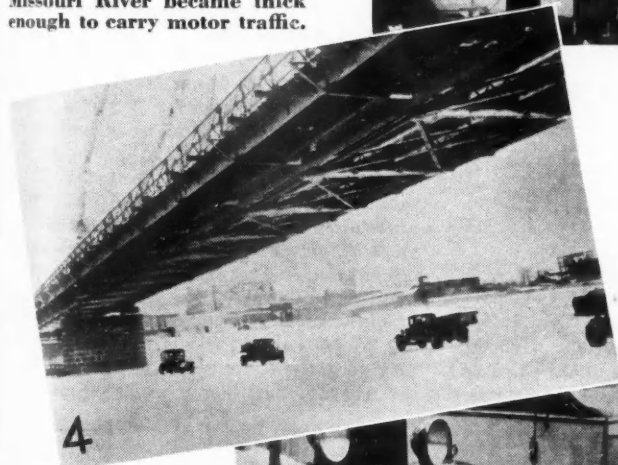
2. A motor-cycle taxi service patrols the outlying districts of Berlin during night hours when taxicabs are not readily available. A phone call will bring one.



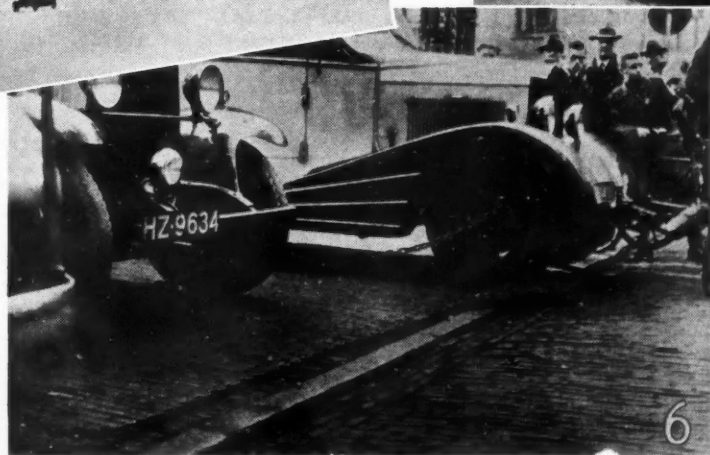
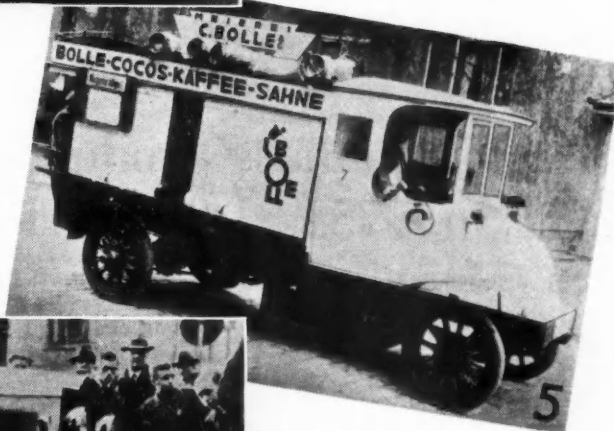
3. A truck, recently demonstrated in Berlin, is built to carry a complete railway freight car, with its load.



4. The toll bridge between Sioux City, Ia., and Sioux City, Neb., lost revenue this winter when ice on the Missouri River became thick enough to carry motor traffic.



5. Berlin has a "coffee-pot" on wheels. This neat, white truck sells coffee, milk and cocoa in residential districts.



6. Netherlands railways have found a way to prevent bus competition. The government owns the railways, so when bus competition between the Hague and Amsterdam became troublesome, the buses were tied up with chains and their passengers told to take a train.

European, International, Keystone, Solbelman and Wide World photos.

Business Combats Price Control Bill

(Continued from page 355)

more or less effective in influencing Congress because of the political tendency to play to the "small man." Yet a strongly organized consumers' demonstration no doubt would be even more impressive, since consumers greatly outnumber small merchants.

The Robinson-Patman bill proposes amendment to Section 2 of the Clayton Anti-trust Act, which as it now stands, requires that price discrimination, in order to be unlawful, must have the effect of substantially lessening competition or tend to create a monopoly. It also does not forbid price discriminations based on differences "in the grade, quality, or quantity of the commodity sold." The chief significance of the amendments now proposed arises from their effect upon these provisions.

The Patman bill would make it unlawful for any person to discriminate in price or in terms of sale between different purchasers of commodities of like grade and quality. The existing law does not include discrimination in terms of sale. The pending legislation also would eliminate the qualification that price discriminations, to be unlawful, must have the effect of substantially lessening competition. It would definitely allow price differentials based on different classes of purchasers. Thus it would permit the fixing of different prices for wholesalers, retailers, buyers for further manufacture or final consumers. It provides that price differentials may be allowed "which make only due allowance for differences in the cost of manufacture, sale or delivery resulting from the different methods or quantities in which such commodities are to such pur-

chasers sold or delivered." This provision would prohibit price differentials based on quantity purchases not now restricted under Section 2 of the Clayton Act. Quantity discounts would be allowed only to the extent of the actual saving in cost resulting from the quantity sold.

This means that quantity discounts would be allowed only to the extent that such discounts represent the actual differences in the cost of producing or selling the particular shipment upon which the discount is given. The National Association of Manufacturers pointed out that if a large order should have the effect of reducing the unit cost of total output, this reduced cost apparently could not be credited to the large buyer in the form of a lower price. The large buyer, therefore, could be sold at a price differential representing only the actual saving in the cost of producing his own order.

The Patman bill also would specifically make it unlawful to pay commissions, brokerage fees or other compensation to any person involved in the sale or purchase of goods where such person is not acting on behalf or under the control of the seller. Furthermore, the bill would make it unlawful to pay any customer for any services or facilities furnished by the customer in connection with the processing, handling or sale unless such payments are offered on proportionately equal terms to all customers competing in the distribution of such products, or unless the business of the customer is not identified in any way with the rendition of such services and exceeds the fair value of the services rendered.

The Robinson bill is substantially the same as the Patman bill, except in two respects. The former retains the provision of present law that price discriminations must substantially lessen competition or tend to create a monop-

oly, but narrows its effect by prohibiting price differentials which injure, destroy or prevent competition "with any person who either grants or receives the benefit of such discrimination, or with customers of either." It also, in addition to prohibiting price differentials based on quantity purchases except to the extent that such differentials represent actual differences in costs, provides that the Federal Trade Commission may fix and establish quantity limits as to particular commodities where it finds that large scale purchasers are so few as to render differentials unjustly discriminatory or promotive of monopoly.

Senator Robinson told the "liberty marchers" that he would guarantee that, although several amendments might be adopted to the bill, its strength would not be "vitiated."

Senator Borah and Senator Van Nuys have introduced a bill making it unlawful for any person engaged in commerce to grant any discount, retail allowance or advertising service charge to a purchaser over that available to the purchaser's competitor. Like most other legislation, this bill is directed at chain stores and again, like other legislation, it exempts cooperative associations and is intended chiefly to exempt agricultural interests.

Motor Employment Near 1929 Record

(Continued from page 355)

While average employment in 1928, the industry's previous second best year, was 3000 less than last year's total, production for that year was 350,000 units greater.

The industry's effort to stabilize employment, aided materially by the fall new model introduction program, is at once apparent in the reduction of the employment fluctuation from month to month. Last year this fluctuation amounted to only 8.6 per cent compared with 12 per cent in the previous year. In 1934 the average monthly employment fell below 400,000 men for a total of eight months, while in 1935 this figure was surpassed in all but two months and in only four months, all told, did the average fall below 430,000 workers.

Kermath Introduces Three New Diesel Marine Engines

Diesel engines for light marine craft as well as the heavier types are announced by Kermath Manufacturing Co. with the introduction of three different models. The engines range from the light type of 79 hp. to the heavy one of 160 hp., according to F. C. Morgan, president. Production is to start at once. The company makes 28 other types of marine engines.

Greatest January Production Gain Was in \$751-\$1,000 Price Class

Passenger Car Production by Wholesale Price Classes

(U. S. and Canada)

	January		Per Cent Change	Per Cent of Total	
	1936	1935		1936	1935
Under \$500	180,694	139,979	+29.0	58.07	58.94
\$501-\$750	115,275	87,970	+31.0	37.04	37.04
\$751-\$1,000	10,864	4,786	+127.0	3.49	2.01
\$1,001-\$1,500	3,096	3,034	+2.0	.99	1.28
\$1,501-\$2,000	685	801	-14.5	.22	.34
\$2,001-\$3,000	526	652	-19.3	.17	.27
\$3,001 and over	47	280	-83.2	.02	.12
Total	311,187	237,502	+31.0	100.00	100.00

Truck Production by Capacities

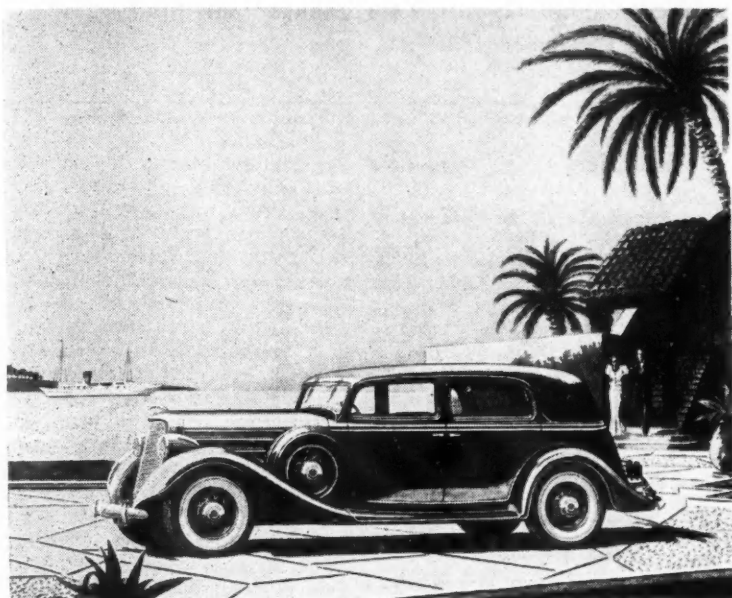
(U. S. and Canada)

	January		Per Cent Change	Per Cent of Total	
	1936	1935		1936	1935
1½ tons and less	66,133	62,771	+5.2	95.34	95.27
2 to 3 tons	2,269	2,313	-1.6	3.27	3.51
3½ tons and over	609	602	+1.0	.88	.91
Special and buses	356	204	+74.5	.51	.31
Total	69,367	65,890	+5.3	100.00	100.00

March 7, 1936

Automotive Industries

Cited for Design



THE FIVE-PASSENGER TWO-WINDOW SEDAN

THE LINCOLN

Like an urbane and traveled guest, the Lincoln is supremely at home among people who live well. Year after year, it earns their esteem in town and countryside. And, year after year, the Lincoln advances steadily in beauty and engineering excellence. Thus the new Lincoln is a more desirable car to own even than its predecessors. . . . Lincoln engineers have built their finest power plant in the present powerful V-12 cylinder engine. But in this new car, the engine is placed further forward in the frame. Because of this new designing, there is greater room, as well as greater comfort, in the new Lincoln. The weight of rear-seat passengers is poised ahead of the axle, rather than directly over it. . . . Seen across a southern landscape, or weaving swiftly through city traffic, the Lincoln appears, and is, more beautiful than ever before. Here the best in modern design unites gracefully with traditional beauty which is Lincoln's own. Elegance in every detail is a forecast of the agility and the stamina of the Lincoln on the road. There are eighteen standard and custom-built body types, the latter built by Bruen, Jenkins, Willoughby and Le Baron.

This Lincoln advertisement by N. W. Ayer & Son, Inc., is designated as the "Most distinguished by the excellence of its layout, art and typography." So say the judges of the 1935 competition of advertising instituted by Edward W. Bok and administered by Harvard University until 1930 but conducted by *Advertising and Selling* this year. The type used is Corvinus of the Bauer Type Foundry, New York.

Higher Schedules Fixed for March

(Continued from page 355)

Encouraged by the quick response of the buying public to improvement in weather, dealers are stepping up materially their orders at the factories.

A gain of 300 per cent is noted by one company over the rate of orders two weeks ago. Production had been curtailed so sharply last month that in some instances field stocks were slightly reduced and few dealer organizations added any great number to their inventories. One important producer shipped only half as many cars as in January. The industry as a whole last month was probably down over 20 per cent from January and will do well to show 300,000 units for the month.

Higher schedules have been set for March. In most cases these are only tentative, subject to upward revision if the sales trend continues favorable. The expectation is that increases will be general as the month progresses. Week-to-week advances are in order. The governing factor, of course, will be weather and its effect on retail sales.

As one official observed, "Nature can do more in 24 hours to change the sales picture than millions in advertising." Generally speaking, manufacturers expect only to keep abreast of sales this month. Having built up a good bank of parts during the slack period, schedules are flexible and can be tuned closely to demand.

Studebaker

Studebaker Corp. shipped 6170 cars and trucks in February compared with 6036 in January, making the total for the two

months this year 12,206. . . . February export shipments were the largest in over 7 years. For the first time all 1929 monthly figures were topped—last month's total being more than double that of February last year.

Nash

Nash Motors closed its February operations with shipments in excess of any February since 1931. . . . Gain over corresponding month last year was 34.4 per cent. For the first fiscal quarter ended February, shipments were 27.6 per cent above like period a year ago. C. H. Bliss, vice-president and director of sales, said that March production and sales will show material increase and that the bank of orders at the start of the month was 108 per cent larger than a year ago.

Terraplane

Sales of Terraplanes for February, 1936, totaled over 5100. This exceeds any February since 1930, according to the company. Reports from a large section of the United States indicate that the hard winter has resulted in a tremendous pent-up demand which will be realized during the last half of March and through April.

Hudson

Sales of Hudson and Terraplanes for the month of February were greater than for any February since 1930, and totaled over 5100 units, according to figures just released by the company.

Reeves Supports Safety

(Continued from page 355)

preceding day, had declared open warfare on what they termed the lunatic fringe of motorists and pedestrians. (A summary of the new program appears on page 356.)

"In ridding the highways of reckless and misfit drivers," Mr. Reeves declared, "the motor vehicle administrators will throw a greater degree of safety and mental comfort around the vast majority of motorists and pedestrians who, by their careful use of the highways, have won the right to the utmost driving pleasure and mental tranquility."

Mr. Reeves continued with comments on the various provisions of the program with special mention of the placing of responsibility in the hands of the administrators and of their recognition of the fact that highway safety was a matter to be dealt with by the individual States. High praise was given for the effort to create uniform State laws, including the universal power of suspension or revocation of the driver's license.

Air Tunnel Tests Fix Plane Top Speed at 575 M.P.H.

Approximately 575 m.p.h. is the top speed for airplanes with present wing design, according to George W. Lewis, director of research of the National Advisory Committee for Aeronautics. At this speed, Doctor Lewis says, the sustaining flow of air over the wing suddenly breaks away in a shock wave and the airplane loses all its lift.

These deductions are the result of recent tests at the committee's new super speed tunnel at Langley Field, Va., where compressed air jets can create an air flow of 750 m.p.h.

January Passenger Car Exports Up 36%, Trucks 43% Over Last Year

Exports and Imports for the Automotive Industry for January and Six Months Ended December 1935-1934

	January 1935		January 1934		Six Months Ended December 1935		Six Months Ended December 1934	
	Number	Value	Number	Value	Number	Value	Number	Value
EXPORTS								
Motor Vehicles, parts and accessories.....	....	\$22,082,911	....	\$17,208,344	....	\$103,845,470	....	\$84,496,632
PASSENGER CARS								
Passenger cars and chassis.....	15,779	8,896,437	11,035	6,563,737	77,591	41,346,450	65,922	34,807,283
Low price range, up to \$850 inclusive.....	14,729	7,675,596	9,997	5,361,957	73,037	36,144,999	60,401	28,895,634
Medium price range, \$850 to \$1,200.....	818	784,655	692	657,821	3,542	3,344,888	3,718	3,580,838
\$1,200 to \$2,000.....	143	205,729	147	235,788	685	1,033,137	808	1,182,362
Over \$2,000.....	89	230,457	109	273,529	327	823,426	356	901,372
COMMERCIAL VEHICLES								
Motor trucks, buses and chassis (total).....	9,756	4,867,661	6,591	3,417,353	52,662	26,608,305	42,886	21,040,300
Under one ton.....	1,670	603,393	434	155,105	6,022	2,047,514	4,685	1,613,022
One and up to 1½ tons.....	6,708	3,093,046	4,979	2,273,977	37,663	17,425,472	33,043	14,394,723
Over 1½ tons to 2½ tons.....	1,158	813,015	1,028	777,635	7,589	5,389,481	4,189	3,999,850
Over 2½ tons.....	201	332,313	122	197,705	1,277	1,607,957	768	1,435,493
PARTS, ETC.								
Parts except engines and tires.....	....	5,127,262	....	4,554,343	....	16,658,798	....	12,340,392
Automobile unit assemblies.....	....	1,947,599	....	1,895,889	....	13,665,554	....	10,995,830
Automobile parts for replacement (n.e.s.).....	....	339,794	....	207,297	....	1,547,361	....	1,221,256
Automobile accessories (n.e.s.).....	....	417,408	....	188,028	....	2,048,617	....	1,225,059
Airplanes, seaplanes and other aircraft.....	24	556,021	26	1,083,062	151	2,121,546	344	5,696,671
Parts of airplanes, except engines and tires.....	....	301,600	....	361,030	....	2,631,473	....	3,480,262
INTERNAL COMBUSTION ENGINES								
Stationary & Portable								
Diesel and semi-Diesel.....	52	185,806	58	59,921	184	578,819	102	386,153
Other stationary and portable.....	775	56,478	1,051	49,870	5,341	298,345	3,468	218,341
Not over 10 hp.....	180	94,248	97	80,617	734	423,410	597	262,139
Over 10 hp.....	....	....	....	....	....	....	....	....
Automobile engines for:								
Motor trucks and buses.....	2,302	215,666	114	25,474	7,041	671,924	1,417	214,141
Passenger cars.....	4,812	318,200	2,110	135,623	11,769	888,484	4,637	337,793
Engines and aircraft.....	....	....	32	111,196	....	....	553	2,375,059
Accessories and parts (carburetors).....	....	135,213	....	105,718	....	749,536	....	674,810
IMPORTS								
Automobile and chassis (durable).....	....	....	40	25,089	....	....	363	98,222

Automotive Group Second in Sales and Gains for All Retail Outlets

Total automotive retail sales for the country in 1935 showed an increase of 25 per cent over the previous year and amounted to \$6,739,000,000, according to estimates of the Bureau of Foreign and Domestic Commerce. This figure was surpassed in volume only by the

food group, with \$8,069,000,000, and its gain over 1934 was topped only by mail order catalog business which increased 26 per cent.

Of the total estimated retail business of the country, \$32,606,000,000, the automotive group accounted for 20.7 per

cent, while the food group took 24.8 per cent and the next highest, department stores, accounted for only 11 per cent.

Next to the gains of the automotive and mail order businesses were furniture and household goods with 21 per cent; lumber, building and hardware with 20 per cent, and restaurants with 18 per cent.

As compared with the 1929 levels, the automotive group still trailed many others with an aggregate of but 70 per cent of that year's total. Leading in this classification in the order named were restaurants, variety stores, mail order business, drug stores and the food group.

The table below gives a breakdown of all retail business with comparative data:

Estimated Net Sales of Retailers by Kind of Business

Kind of Business	Millions of Dollars 1935	Millions of Dollars 1934	1935		
			Per Cent Increase Over 1934	Per Cent of Total Retail Sales	Per Cent of 1929 Sales
Food Group.....	8,069	7,269	11	24.8	74
Automotive Group.....	6,739	5,391	25	20.7	70
Department Stores.....	3,587	3,352	7	11.	70
Apparel Group.....	2,451	2,269	8	7.5	58
Restaurants, Eating and Drinking Places.....	2,102	1,788	18	6.4	99
Farmers' Supply — Country General Stores.....	2,063	1,842	12	6.3	56
Lumber, Building and Hardware Group.....	1,853	1,544	20	5.7	48
Furniture and Household Group.....	1,370	1,132	21	4.2	50
Drug Stores.....	1,267	1,173	8	3.9	75
Variety Stores.....	757	742	2	2.3	84
Mail Order, Catalog only.....	346	275	26	1.1	77
Jewelry Stores.....	231	201	15	.7	43
Other Retail Outlets.....	1,771	1,671	6	5.4	53
Total.....	32,606	28,649	14	100.0	66

March 7, 1936

All French Headlights To Be Yellow Before July 1

A recent decree of the French Minister of Public Works provides that all headlights shall be yellow instead of white as heretofore, according to press reports. An investigation in France is said to have proved the yellow beam to be safer and less blinding to the eyes. Subject to ratification the date for change-over is set for July 1.

Automotive Industries

METALS..

Recent Automotive Upturn Encourages Steel Industry

After having tapered off for several weeks, specifications and inquiries from automotive consumers indicate a turn in the tide and a gradual increase in steel buying from now on. Even Detroit rolling and finishing mills had begun to feel sharply the contraction in automotive demand, but the last few days are reported to have brought some encouraging releases for early shipment. The rate of ingot capacity reported by the American Iron and Steel Institute to be operating this week is 53.5 per cent of capacity, as compared with 52.9 per cent in the preceding week, and the general expectation is that March operations will average around 55 per cent.

Whether the slowness with which fresh commitments are coming out is intended as a warning to steel sellers to go slow in their efforts to lift prices is difficult to determine. Certain it is that what still pass as nominal quotations have long since ceased to be the actual market, and that there is more and more in the way of selling at going concessions, even in those descriptions of steel that up to a short time ago were considered to be firm, such as, for instance, hot rolled steel bars.

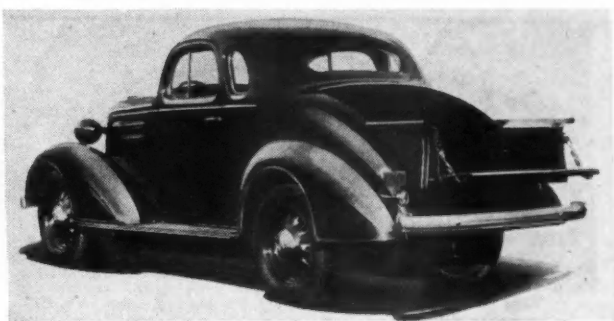
Much interest was aroused in the steel market this week by publicity of an inspired character and obviously directed at uninformed Wall Street criticism of the policies of leading steel producers. It is pointed out that, when all of its new light steel mills are completed and in operation, the leading interest will be in position to compete for a much larger share of the automobile business than it has booked in the past. Its ratio of capacity will be sufficiently augmented by these improvements to give it a little more than 45 per cent of the entire steel-making capacity, assuring continuance of its leadership and yet sufficiently below the line at which insinuations of monopolistic intent could be leveled at its policies. While day-to-day changes in the steel market reflect but little the incisive transformation that is taking place in capacity and competitive conditions, an occasional glance at the steel industry's picture as a whole will prove highly informative.

Pig Iron—The market is marking time. Improved weather conditions are making for a little more filling-in business. Prices are unchanged.

Aluminum—According to a Bureau of Mines report, production of primary aluminum in the United States last year was 119,295,000 lb., compared with 74,177,000 lb. in 1934. The value of the 1935 production was \$22,070,000, compared with \$14,094,000 in 1934. These figures denote a gain of 60.8 per cent. Imports of aluminum last year totaled 21,075,683 lb. against 18,530,072 lb. in the preceding year. 1935 imports having been the heaviest since 1930. The market is steady and unchanged.

Copper—The dual price set-up of 9½ and 9¼ cents remained in vogue at the beginning of the week. There wasn't much business done at either price level. In spite of this, majority sentiment inclines to the

Chevrolet has introduced a "coupe-pickup," combining passenger car appearance with the utility of a small commercial car



belief that before long 9½ cents will become the generally ruling price level.

Tin—The London market turned weaker on Monday, the world's visible supply having shown a slight increase. Spot Straits declined ¼ cent, being quoted at the week's beginning at 48 cents.

Lead—Storage battery manufacturers took large tonnages before the recent advance. The market is firm.

Zinc—Demand light.

Chevrolet "Coupe-Pickup" Built to Carry Packages

A new type of vehicle combining passenger car appearance with the utility of the small commercial car has been added by Chevrolet Motor Co. to its standard line. It is called the "Coupe Pickup" because it consists of a regular standard coupe and a pickup body which is built in the rear compartment of the passenger body, extending but a short distance beyond the sweeping curves of the rear deck.

The load space of the box is 60 in. long by 41 1/16 in. wide. Inside, the opening under the rear-deck is 16¼ in. deep, which permits the loading of large packages well forward on the platform. When the tail gate is lowered flush with the floor the platform is 71 in. long. To support the pickup load adequately, sedan chassis springs are used in the

rear instead of the lighter coupe springs. The Chevrolet coupe-pickup model lists at \$535.

Detroit Welding Chapter Hears Time Control Talk

Members of the Detroit Chapter of the American Welding Society were treated to an illustrated talk on "Short Timing Control in Resistance Welding" by J. W. Dawson, control engineer, Westinghouse Electric & Manufacturing Co. William H. Hayes, Detroit manager, Air Reduction Sales Co., presided.

The speaker dwelt entirely on the application of the Ignitron tube timing control developed by his company and showed the apparatus set up as in the plant. The Ignitron control gives precise timing in adjustable steps of ½ cycle up to 15 cycles duration. It is claimed that the most important feature of timing control for any resistance welding operation is its ability to produce perfect welds consistently and more rapidly than by any other method. One of the most recent applications of Ignitron control is for seam welding where the spacing of spots is accurately controlled by means of a timing disc.

CALENDAR OF COMING EVENTS

SHOWS

- Austria, Automobile Show, Vienna, March 8-15
- Switzerland, Automobile Show, Geneva, March 20-29
- Hungary, Automobile Show, Budapest, Mar.-April
- Illinois Automotive Parts Assoc., Maintenance Exhibit, Navy Pier, Chicago, April 4-8
- Portugal, Automobile Show, Lisbon, begins April 16
- Yugoslavia, Automobile Show, Zagreb, May 2-11
- Spain, Automobile Show, Madrid, May 10-20
- International Petroleum Exposition, Tulsa, Okla., May 16-23
- Morocco, Fair of Tangiers, May 16-24
- Yugoslavia, 16th International Spring Fair, Lubiana, May 30-June 11
- France, Automobile Exhibit at Foire de Paris, May
- Norway, Automobile Show, Oslo, May
- Olympia Motor Show, London, England, Oct. 15-24

CONVENTIONS AND MEETINGS

- American Chemical Society, 91st Annual Meeting, Kansas City, Mo., April 13-17
- S.A.E. Tractor and Industrial Power Meeting, Milwaukee, Wis., April 15-16
- American Gear Manufacturers Association, Twentieth Annual Convention, Philadelphia, April 20-21
- S.A.E. Production Meeting, Detroit, Mich., April 21-24
- U. S. Chamber of Commerce, Annual Meeting, Washington, April 27-30
- American Petroleum Institute, Mid-Year Meeting, Tulsa, Okla., May 13-15
- S.A.E. Summer Meeting, White Sulphur Springs, W. Va., May 31-June 6
- Automotive Engine Rebuilders Assoc. Annual Convention, Cincinnati, June 1-4
- American Society for Testing Materials, Annual Meeting, Atlantic City, June 29-July 3
- American Society for Metals, 18th Nat'l Congress, Cleveland, O., Oct. 19-23

You don't have to "nurse" a CARAVAN CAR

IT'S CAREFULLY BROKEN IN WHEN YOU BUY IT
and you Save \$50 to \$75 on brand new

When you buy one of our new **caravan** cars, you are spared the inconvenience of driving at the slow speed that is usually necessary with a new car. For these cars are carefully broken in before delivery—broken in scientifically, so that they are really better cars as long as they are driven, than if broken in in the usual way.

Yet it is possible for us to sell them at \$50 to \$75 less than regular delivered prices. That means that you can buy a Terraplane at less than the delivered price of any other leading lowest price car.

Driving these cars from the **factory** at Detroit, are men chosen for their experience and responsibility. All are bonded, full-time, adequately paid employees.

Expert Mechanic in Charge

With each caravan is an expert mechanic who inspects every car frequently on the trip and sees that all are thoroughly lubricated

every few hundred miles. A governor regulates the speed of each car, and finish and upholstery are completely protected.

As a result, when these cars are delivered to buyers, they are ready to GO—and keep on going. In fact, they are in far better shape than most cars broken in by their owners.

See and drive one of these caravan cars—now here. Our experience shows that they don't stay long in stock.

So, if you are interested in a new car—with a full new-car guarantee—that is all ready for you to get in and drive as far and as fast as you want to—and at a very substantial saving, call on us or phone today. We'll be glad to arrange a demonstration.

Examples of Caravan Cars
Delivered Prices in Salt Lake
1935

An advertisement
which appeared
in the Salt Lake
Tribune

transportation. Where factories were located in water-front cities and where destination permitted shipment by water served to give a considerable saving in freight charges. Sometimes, where dealers were located in towns not too far distant from the factories they drove them through overland.

Good roads, attainment of mechanical stability and unlimited tire mileage have altered the picture until less than half the cars are moved from factories

Caravan Delivery Several Sources

CAR makers have set a goal for themselves of 4,500,000 new units in 1936. Plants are running at full blast and assembly lines which had stood gathering dust are pushing them out with clock-like precision.

Producing 4,500,000 cars in 12 months' time is a big order. But of every bit as great magnitude is the problem confronting manufacturers of getting rid of those cars. Getting them away from the factories into the dealers' hands has been a matter of growing concern ever since the heydays of 1928, or when dressed-up appearance

was given along with finer engineering qualities. Today this is looked on as one of the biggest problems in the industry.

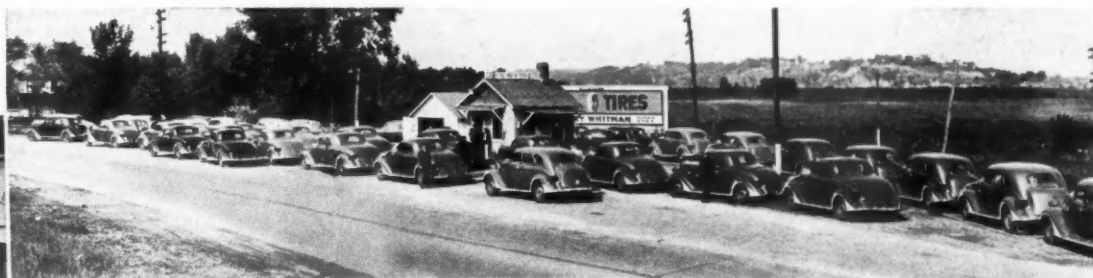
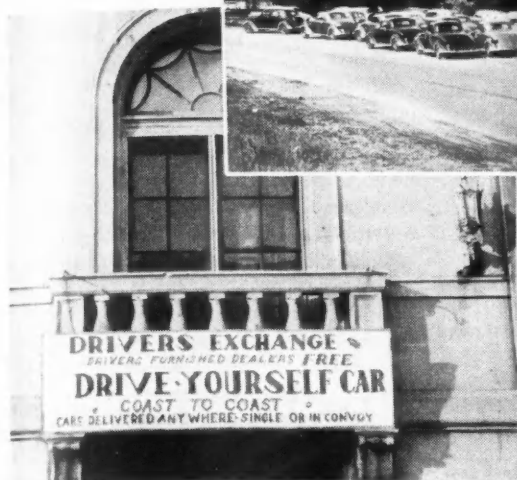
Looking back to the early days of the industry most manufacturers simply rolled the cars from off the assembly line into freight cars, blocked them so they wouldn't be rolling backward and forward in transit, and that was about all there was to it. Bad road conditions, tires that were good for little more than a few thousand miles, and the fact that the cars themselves lacked mechanical dependability to insure long distance drives with safety, combined to practically eliminate all other forms of

by rail. They are driven or carried through overland—by caravan. To such immense proportions has caravanning grown that with 4,500,000 cars being turned out in 1936, over 2,500,000 may be expected to be delivered by that means either by tractor-trailers or by the tow bar method.

In 1928, 64.7 per cent or 2,568,937 cars were shipped from factories to dealers by rail, against only 30.8 per cent delivered overland. In 1934, railroads carried only 45 per cent, against 48.8 per cent overland. Until the final figures are made available for 1935 it is assumed that the percentages are substantially the same as for 1934, al-

A fleet of trucks "two-way hookup" ready to be caravanned





Caravan of forty cars at Port of Entry station in Kansas while paying taxes and obtaining clearance papers

Sign advertising for caravan drivers displayed on a small hotel in Detroit

ry of Cars Draws Fire from es but Continues to Grow

though they will undoubtedly show an increase for overland delivery and a corresponding drop in rail deliveries. The low point in rail shipments was reached in 1932, when 37.7 per cent, or but 457,870 cars, were delivered by railroad freight, while 58.1 per cent, or 706,977, were caravanned. The high point of water shipments was in 1932, when 7.2 per cent were so shipped. In 1934 this had dropped 1 per cent, and last year's figure will show a still further decline. This year it is not expected to go over 7 per cent.

An exhaustive survey on the caravanning of automobiles has just been completed by Joseph H. Hays, counsel for the Western Association of Railway Executives. While the survey was made primarily for the education of railway officials—to show them the way to recover lost tonnage traffic—it goes into every phase of the matter and points out impartially the good and bad aspects of both rail and caravanning transportation. "Caravanning," says Mr. Hays, "bears certain advantages which the railroads practically forced into being.

"Up to certain limits, trucking of automobiles has borne the advantage of convenience of showroom-door delivery. Also, up to those limits, it is fundamentally cheaper than rail transportation—with saving of expense of dun-

nage (materials for blocking and bracing) and eliminates the transportation cost on dunnage and loading and un-

loading costs and inconvenience. These costs will range from \$16 to \$20 per freight car load. Neither," he continues, "is caravan delivery faced with demurrage charges.

"Perhaps the earliest concentrated caravan movement goes back to the time when shortage of railroad freight cars caused some dealers to drive their

An advertisement which appeared in a Boise, Idaho, newspaper

Here is the Actual Record of Idaho Car Sales

For the ~~Year~~ Six Months of ~~1935~~

582 — 5753

Cars Sold By Dealers Who
DO CARAVAN

Cars Sold By Dealers Who
DO NOT CARAVAN

the above figures taken from report of the
Automobile Service Bureau

From these figures it will be readily seen that dealers who resort to bringing cars in by caravan sell **LESS THAN 11 PER CENT** of the automobiles sold in Idaho.

In buying a caravanned car the purchaser **DOES NOT SAVE** when he considers the wear and tear on the car that is driven or towed from factory to Idaho.

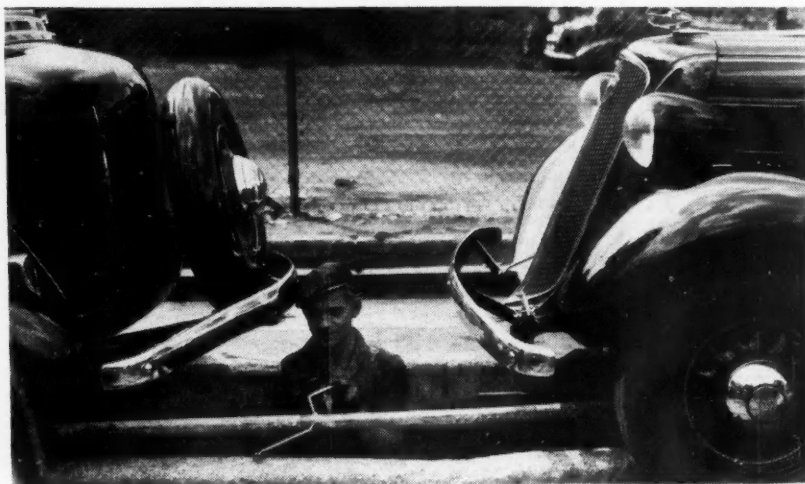
There being no law that forces a dealer to inform the customer that a car has been driven from the factory, the dealer, if he chooses, may tell the customer that it is a new car. Nor is there a law to prevent dealers from disconnecting the speedometer while the trip is being made.

Caravanning has developed a practice in some sections of the country that is deplorable.

Caravanners in many instances have picked up jobless men in the east to drive cars into the west for their meals but no wages. **AND THEY HAVE TURNED THOSE MEN LOOSE IN THE WEST,** forcing the people in western states to care for them.

—DO NOT PERMIT caravanning because they want to know that the purchaser gets a car that has not been driven or towed when he buys a new car.

**The Following Boise Dealers
Do Not Caravan Cars
From Factory to Boise**



Attaching tow bars to cars headed for the coast

own cars through during and immediately after the war. Some dealers, whose places are within 300 to 500 miles radius from the factories, have continued it uninterruptedly. But the real impetus for long distances, and especially through to the Pacific Coast, was not given until quite recently.

"The facts as they have been told me by a manufacturer are that the National Bank holiday was the stimulating influence. A California dealer, doing business in a rural area, is said to have been unable to finance freight charges and car purchases during that time. In order to meet the condition it is reported that he drove a number of his employees east to the factory, arranged with his finance company to purchase 22 cars and used his own drivers and a few others whom he picked up to drive them through to California on their own wheels. The out-of-pocket expense of this is said to have been so small that he was able to sell them at destination for a substantial discount from the normal delivered price. This discount provided such a sales impetus that he sold them all in a few days and was back at the factory within three weeks for another block of 32 cars. This activity attracted the attention of the factory, other dealers were acquainted with the results and the movement was on.

"Whether or not this version is correct, it is generally recognized that this manufacturer has been a pioneer in caravanning. The pressure of competition by dealers of this make of car selling caravanned cars at discounted delivery prices is said to have successively affected Graham-Paige, Hupmobile, Hudson, Nash and some others to such extent as to modify traffic policies so as to permit caravanning and in some instances to encourage it.

"The aggregate volume of caravanned cars to inter-mountain and West Coast

territory in the spring and summer of last year has been estimated at in excess of 3000 cars per month. The manufacturer whose West Coast dealer's experience is recounted reports that about 90 per cent of their finished cars are now moved over highways from factory to destination."

The situation on the West Coast, and in several parts of the country, is likely to undergo change this year. Stude-

Advertising of the
Better Business
Bureau which
was printed in the
Detroit Times

ANOTHER ADVANCE FEE RACKET . . .

The following advertisement appeared a few days ago:

"Drivers. Experienced. To Drive Car
West. References. Telephone—"

Unemployed young men who responded were required to deposit from \$2 to \$5 (depending upon how much they had in their pockets) as assurance that they would appear at the time specified to drive a car to California. They were told that all expenses would be paid and that they would receive \$25 and a return ticket to Detroit when they reached their destination.

At the appointed time, some thirty young men were on hand and ready to go. Their advance fee collecting employer, however, failed to put in an appearance. It was found that he had checked out of his hotel the night before with over \$100 in "good faith deposits."

The State Superintendent of Private Employment Bureaus advises that those who make such offers are evading the law if they have not obtained a license as an employment agency. Job seekers are urged to call the State Superintendent's office—R.A. 6680—or the Better Business Bureau, before parting with their money or accepting such employment.

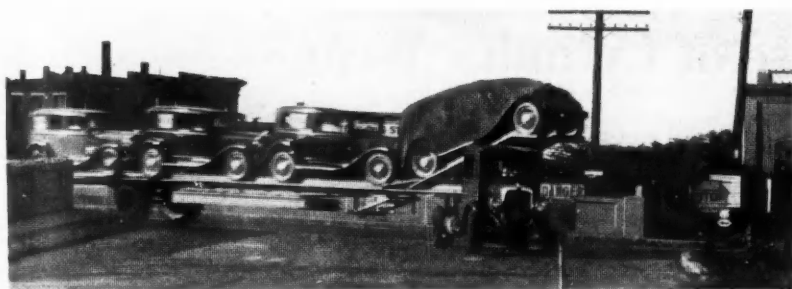
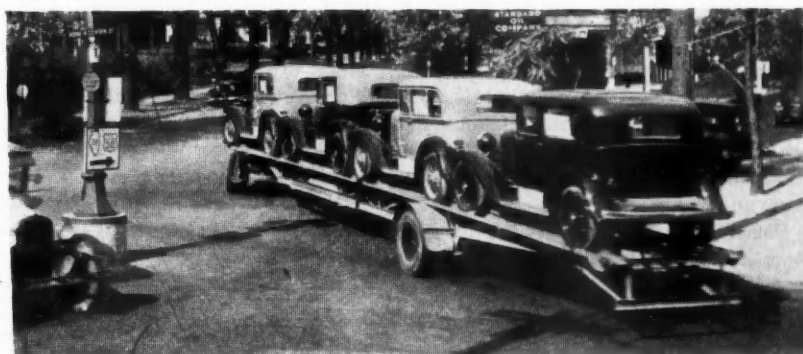
THE
BETTER BUSINESS BUREAU
OF DETROIT, INC.

1944 National Bank Building

RAndolph 7566

This publication subscribes wholeheartedly to the principles of the Better Business Bureau and co-operates with the Bureau in protecting you . . . even to the extent of refusing to accept the copy of firms whose advertising and sales policies are proved to be contrary to public interests.

Another form of over-the-road delivery is the tractor trailer, used for the greater part over short distances



ing is usually done with one car being driven and towing another.

"The tow bar is one of the most valuable accessories to caravanning. It enables one man to transport two cars with fuel consumption for one. Cost of tow bars runs to about \$20 or \$25, and as they suffer little from depreciation in value represent about the only capital investment of those engaged in this form of car transportation."

Last year saw considerable attention being directed at caravanning. A great deal of the attention was directed at the tractor-trailer units which had become of such lengths as to be virtual nuisances on many congested highways. Some states, and not a few cities, passed laws limiting lengths of these units.

"But the bulk of the attack," Mr. Hays' findings reveal, "has been directed at the tow bar method, and it comes from within dealer ranks. It has been aimed by those whose cars are delivered either by rail freight or by trailer trucks.

"Dealers whose cars are not caravanned have preached that caravanned cars are in reality second-hand cars. They have declared that the strain on the lead car has weakening effects, and that instead of being broken in rightly by experienced drivers, they are actually turned over to inexperienced drivers and driven at such speeds as to cause bad effects.

"On the other hand, dealers who caravan their cars advertise 'You Don't Have to "NURSE" a Caravan Car'

and write off from \$50 to \$75 from the delivered list price, which they hold out as saving in freight charges."

Nebraska last year passed a law requiring each caravanned unit to be labeled as such when sold as a new car.

"On the evidence which the survey produced," continues Mr. Hays, "there is little doubt but that certain contract caravanners are commercializing their business to other channels than caravanning. They are, to put it commonly, sadly abusing the privilege.

"Hardly any of them employ regular crews, depending on picking up transients who want to get to the Coast; usually these are little more than grown boys. Some contract carriers go so far as to expect drivers to pay a part of the gasoline expense. Usually, though, the practice is to pay them a small driver's salary. In some centers Better Business Bureaus have stepped in and caused to be published newspaper stories and advertising warning the public.

"Another thing is that a goodly number of caravanners carry passengers, either on the 'share expense' plan or for flat fares anywhere from \$5 to \$20."

Mr. Hays points out that one point of the argument between caravan and non-caravan dealers has been that caravan dealers sometimes hide the identity of the tow cars, claiming all cars to have been towed. Non-caravan dealers, he says, have made much capital of this.

By far the bigger percentage of

caravanning is confined to the field of passenger cars. But this is only because the number of passenger cars is so much greater than the number of trucks and buses. The transportation of trucks and buses by rail has become almost a thing of the past. On this Mr. Hays says, "The proportionately greater weight of trucks and buses enhances the possible savings available by caravanning. The diversity of factory locations frequently affords an opportunity for the practical use of a return haul for drivers. One concern has an apparently profitable arrangement under which it caravans new cars from Wisconsin into Ohio, Virginia, Pennsylvania and other eastern states, returns its drivers to Ohio and caravans new trucks on the back haul to St. Paul and Minneapolis."

The usual method of caravanning trucks and buses is to load the front axle of one truck onto the rear portion of another truck chassis with the supporting unit acting as the power plant, under what is called a "two-way hookup." Another popular method is to load a light truck on a heavy duty chassis and a third truck is pulled by tow bar by the forward unit.

Mr. Hays cites several instances where states have passed taxing legislation aimed at caravans. Arkansas, by a statutory limitation of auto license exemptions, requires foreign caravanned cars to pay a \$1.50 license fee and drivers to pay a \$5 chauffeur's license fee. California has classed caravanned cars with commercial motor vehicles and exacts a flat fee of \$15 per car. Idaho charged a fee of \$5 per car for highway use. Oklahoma assesses a flat fee of \$5 per car, plus a ton-mile tax averaging about \$2 per car and collects both items through its Port of Entry system. Nebraska, in addition to requiring caravanned cars to be plainly labeled as such, has imposed a regular \$5 tax and an additional fee of \$10 for each car towed or pulled by another. New Mexico has a fee of \$7.50 for singly driven cars and \$5 for each car being towed. Nevada demands a flat

fee of \$7.50 per car. Texas charges \$3 per car and requires a chauffeur's license fee of \$3. Wyoming, Arizona, Colorado, Illinois, Missouri, Kansas, Montana, Oregon, South Dakota and other western states have various statutes as to taxing and licensing caravanned cars.

Caravanning of automobiles has become a business of gigantic dimensions

within the automobile industry. In all probability it will be subject to provisions of the new Federal Motor Carrier Act. Although the law does not apply specifically to carriage by motor trucks or buses, it does refer to operation by motor vehicle.

Mr. Hays calls attention to that practically all caravanning is interstate movement, and that preliminary inter-

pretations of the Act have been to the effect that it is amenable to the law.

"But," he concludes, "the law says that carriers shall define the routes over which their course of business moves.

"Can a caravaner who contracts with any manufacturer to move cars to any point in the United States, define the extent of his operations as 'U. S. A.'?"

Pressure Under Top Piston Ring Major Cause of Cylinder Wear

Editor AUTOMOTIVE INDUSTRIES:

Your many articles on the causes of cylinder wear are very interesting and I have read all of them. I have considered all arguments advanced, and have weighed them against my own personal observations on engines that were used under varying conditions. In conjunction with our factory (we manufacture carburetors and piston rings) we maintain a shop for the installation of our products. Every type of engine comes under our observation, and the observations made point to some very definite conclusions regarding cylinder wear.

First, the major cause of cylinder wear is pressure getting under the top piston ring, forcing it out against the wall much like an inner tube in a tire. I consider this pretty definitely proven by the fact that cars driven under 50 m.p.h. by careful drivers, ladies, and aged men, show very little taper to the top of the cylinders, as a rule.

Secondly, one truck engine that was severely overloaded showed 0.030 in. "pocketing" at the top of the cylinder in 45,000 miles. It had standard pistons and a 0.030 ring would fit at the top. The ridge had to be removed before the piston could be removed from the top of the cylinder.

Wear around the circumference of the cylinder varies with the type of engine. The wear is not always greatest on the thrust side. In L-head engines the cylinders "pocket" opposite the valves and the pistons become loose. The charge entering an L-head engine is deflected directly against the cylinder wall in most engines. This "cuts" the lubricating oil, especially in a cold cylinder. We know of one tractor manufacturer who ran into plenty of piston trouble when he brought out an L-head distillate-burning tractor engine, and I ascribe this to the cause just explained.

Spark-plug location also may effect cylinder wear. The charge in firing

sets up a high pressure wave that may produce a violent shifting of the piston head when pistons are slightly loose, causing directional pocketing. The wiping effect of the flame also destroys the lubricating film. Valve-in-head engines seem to "pocket" most opposite the spark plugs when these are located at the side. The Knight engine, with the spark plug directly over center of the piston, as well as certain air-cooled engines with the spark plug centrally in the cylinder head, show very little offset cylinder wear, so far as my experience goes.

Corrosion in a cylinder came to my attention in one engine that had alcohol in the lubricating oil to prevent the oil from freezing. The cylinder showed a severe coat of rust within a short time. This, however, is not a common cause, and the corrosion can be caused also by certain kind of gasoline.

Pistons also cause cylinder pocketing. Relieved skirt pistons with loose piston pins allow the piston to cramp to the side, "pocketing" the cylinders up to 0.008 in. at the bottom of the piston skirt at the upper end of piston travel both in front and rear.

Air-cooled engines show less cylinder wear in intermittent service.

That top-end cylinder wear varies with the cylinder pressure was indicated by the condition of bores in a car that was driven several thousand miles with late spark. There was no excess pocketing at the extreme top, the wear being greatest about $\frac{3}{4}$ in. down from the upper end of top ring travel.

Looseness of pistons in most cases results, not from piston wear, but from the piston operating up into the zone of greatest cylinder wear caused by the piston rings, the top ring being the main offender.

Oil dilution and consequent cylinder wear in winter time can be reduced by complete vaporization of the fuel at light loads.

The writer put a shunt vaporizing system on a car and drove the car on short runs all winter long. The oil was in good shape in the spring, with no trace of dilution, though it was not renewed all winter. This tends to eliminate cylinder wear under these operating conditions. On one other light six of very small bore, in which the pistons were very cool in sub-zero weather, spark-plug fouling and dilution were eliminated with a shunt fuel vaporizing system. Previously dilution was so bad that the oil pump would quit in 200 miles, because of too thin oil due to excess dilution.

Piston rings shift with the piston due to the air cushion under them. Shifting pistons dip and form a "pocket" in the side of cylinders. This pocket develops above the piston pin ends, because the piston skirt is relieved too much at the top and after the pin becomes loose the piston has little support except through the rings and lands. This pocketing of the engine is what leads to oil pumping and creates a market for special rings of very flexible type.

Cylinder wear can be reduced if the following features are provided for in the design:

1. Self-supporting pistons with full-trunk skirts.
2. Complete vaporization of fuel at light loads.
3. Rings and lands of better wearing quality so the gas has less chance to get under the rings due to end play.
4. Spark plug located in the cylinder axis, if possible.
5. Entering current of fresh charge deflected down on to the piston and away from the cylinder wall.
6. L-shaped top compression ring which will produce less radial pressure against the cylinder wall.

OTTO HALING,
Rochester, Minn.

JUST AMONG OURSELVES

"Genuine" Parts Distribution

WHEN the busy sales manager of a great automobile manufacturer spends time on the road interviewing independent *jobbers* of automotive replacement parts and equipment, with a view to determining their interest in marketing replacement parts of his company—that's news, even though it has happened at least once before.

Several years ago the Ford Motor Co. sought to extend its replacement parts business by trying to induce *jobbers* to take on genuine Ford-made parts. At various times, other automobile manufacturers have had the same idea, and have sent men out to sound the minds of *jobbers* in important centers.

The usual result of such efforts has been a double-barreled flareback. First, *jobbers* consulted feel that the automobile factories are not prepared to offer a long enough discount for the *jobber* to make his usual mark-up. Second, the automobile factory is interested in exclusive representation so far as "genuine" parts are concerned, and many *jobbers* feel that this would destroy the independent character of their business.

Arrangements for sale of genuine parts could probably be made with some "second line" *jobbers* in many localities, but the feeling is that the prestige of the automobile manufacturer might suffer, and the results in sales might not be worth the effort.

The chances for automobile factories tying up the larger *jobbers* seems rather remote at

the moment. The dynamic interest of some factories in increasing their parts and accessories business may produce, however, now that top executives are interested again, some practicable way of getting profits from the parts business.

Washington to Protect Them

THE control of allowances and discounts from manufacturers to purchasers of all kinds is the concern of no less than five bills before the present Congress. All of these are formulated as amendments to the celebrated Clayton Act of 1914; all of them are so vague in portions as to leave broad opportunity for judicial interpretation; all contain big possibilities of annoyance to industry if passed.

The interpreted purpose of each is to protect the independent merchant (sometimes cited as the "crossroads grocer") against the chain store. But in the general language which is necessary to accomplish legally such a purpose, all trading is brought under uniform-discount provisions.

Sponsors and identification of the leading bills are as follows: Patman (HR 8442), Robinson (S. 3154), Van Nuys (S. 3835), Utterback (HR 10,486), and Borah (S. 3670).

It is not likely that the automobile-manufacturing industry will make any unified representation against any or all of these bills. It seems a foregone conclusion that one of them, or a compromise measure acceptable to all the individual sponsors has

a good chance of passing the present Congress.

The Motor and Equipment Manufacturers Association has advised its members as individuals to acquaint themselves with such legislation and to present their views to congressmen and senators. The feeling in Washington is that there is nothing to be gained by the industry in presenting a united front on the questions involved, but so far as we know, executives as individuals are still entitled to express opinions to the solons of Capitol Hill.

Rush Buying— Rising Prices

R. L. COLLIER, secretary of the Steel Founders' Society of America has called attention to the effect of "rush" buying on quality in castings. Hand-to-mouth buying may cost real money in a rising market, he points out, while buying for inventory, allowing plenty of time for a specification to be met may be a good hedge against inflation.

Comparisons Take Novel Tendency

IN a recent announcement of a local showing for the Pierce-Arrow car, we were amazed to read last week the following sentence: "It steers as easily as a Plymouth." Our amazement is no reflection against the Plymouth's ease of steering, but it does seem to be news when the manufacturer of a heavy, expensive car, calls attention to a feature which is found on a car selling for about a fifth the price.

—H. H.

Pneumatic Tires for Farm Tractors

Newly Developed Drop Center Rim

REFERENCE was made in the first instalment of this series* on Tractor development to the application of pneumatic tires to farm tractors. Among the firms which took part in the development of tires suitable for this purpose is the Firestone Tire & Rubber Company. When the plan to fit farm tractors with pneumatic tires was first broached, Firestone happened to have a 48 x 12 airplane tire in production, which is roughly the equivalent of what is now known as the 11.25-24 tire. This was tried out on a Massey-Harris four-wheel tractor, and the results were so encouraging that tractor manufacturers were immediately informed.

It was soon realized that tires of larger outside diameter and a more moderate section were best adapted for the purpose, and most of the dimensional problems were quickly solved. There remained, however, two problems that called for further study and experiment, one being that of a suitable rim and bead combination to assure against slipping of the tire on the rim, the other that of a suitable tread design for the high tractive forces in play.

After having decided that six plies met all requirements, J. E. Hale, manager of the company's development department, next designed and had made a drop-center rim with a tapered bead seat and with a tight fit of the bead on the rim to prevent slippage.

In working out the tread design a

AUTOMOTIVE INDUSTRIES, December 28, 1935, page 852.

Case All-Purpose Tractor Has Motor-Lift for Implements

J. I. CASE CO., Racine, Wis., early in 1935 brought out a new row-crop or all-purpose tractor which featured a motor lift for the implements. All the operator has to do when approaching the end of the field, in order to get the implement out of the ground, is to step on a button projecting from the driver's platform, and

chevron formation was introduced, with wide spaces between the non-skid elements. In the first design the chevrons were quite shallow, but as experience was gained the non-skid elements were deepened and two chevron elements were united by a connecting bar.

In Mr. Hale's opinion the feature which contributed greatly to the success of the pneumatic tire for farm tractors was the drop-center rim, and the selection of large outside and large rim diameters was also of great importance.

the implement is raised by engine power. The implement can be lifted while the tractor is in motion or at a standstill. The next time the same button is depressed the implement is lowered. This power lift naturally saves times. As the tractor is of the "all-purpose" type it has a variable tread, the rear wheels being adjust-



The Case row-crop tractor which features an implement-lift operated from the driver's seat and powered by the engine

able to give treads varying from 48 in. to 84 in.

This Case Model CC all-purpose tractor is equipped with a four-cylinder engine of 3 $\frac{7}{8}$ -in. bore and 5 $\frac{1}{2}$ -in. stroke and is governed at 1100 r.p.m. The engine has removable cylinder liners. The crankshaft has a main-bearing diameter of 2 $\frac{1}{4}$ in. Fuel is carried in an 18-gal. tank and there is also a 2-gal. tank for starting fuel. Ignition is by a high-tension magneto with impulse coupling. An oil-filter type of air cleaner is used, of Case design and manufacture. Cooling is by a tubular radiator with cast tanks and sides, a centrifugal pump and a 16-in. fan driven by a V belt. The capacity of the cooling system is 5 gal. The engine is pressure-oiled by a gear pump, while the whole transmission is inclosed in one housing and all gears operate in an oil bath. Anti-friction bearings are extensively used, there being taper roller bearings in the transmission, the rear axle and the front wheels, while ball bearings are being used on the clutch shaft and the fan shaft.

The belt pulley has a diameter of 11 $\frac{1}{4}$ in. and a face width of 6 $\frac{1}{4}$ in.; it turns at 846 r.p.m., which gives a

Made Practical With of Large Diameter

By P. M. HELDT

belt speed of 26 ft. per min. The tractor has differential foot brakes (which are an aid in steering), a hand-operated transmission brake and a belt-pulley brake operated by the clutch lever. The transmission gives three forward speeds of 2 1/3, 3 1/3 and 4 1/2 m.p.h. and also a reverse speed. With the rear wheels adjusted for cultivating, the tractor can be turned around the point of ground contact of one wheel as a pivot. The steering gear is of the worm and wheel type and is said to be irreversible. The tractor handles either a two-row or a four-row cultivator and pulls a two-bottom or three-bottom 14-in. plow. It also operates a 22-in. thresher.

Among the recent improvements in the tractor may be mentioned the following: The front-wheel bracket now has two sockets into which the front tool bars of the cultivator are clamped. This facilitates attachment and removal of front-mounted implements. The exhaust outlet has been raised and now carries the exhaust high above the driver's head. A new oil pan, with a deep sump toward the rear, maintains an ample oil supply around the pump even when the tractor is on a steep up grade.

Narrow-rim wheels with long steel spade lugs are regular equipment and are said to give better traction under most soil conditions than the equipment formerly supplied. They are said

to be better suited for all row-crop work. Another feature is the new fender mounting, which supports the rear-wheel fenders directly from the rear axle. When the fenders are to be set out after the tread has been widened, it is only necessary to slide out the supporting bracket. The fenders are better reenforced and much stronger. A power take-off with individual throw-out clutch is now furnished with each tractor as regular equipment.

The Case CC "all-purpose" tractor

is designed to burn low-grade tractor fuels such as furnace oil, its combination manifold making it possible to use either gasoline or any of these low-volatility fuels. When changing over from one grade of fuel to the other, a small lever on the intake manifold must be turned. A radiator curtain is furnished as an item of regular equipment and enables the operator to keep the engine at the best operating temperature under all weather conditions.

The two features for which particular claims are made are the ease and rapidity with which tools can be changed and the handiness of the power lift. All that is necessary to drop the two-row cultivator, for example, is to take off two adjusting levers by removing six cotter pins, loosening four nuts, and then sliding out the two front gangs of the cultivator. The rear gang is removed by simply taking out two cotters on the lifting bail, uncoupling two hinge connections on the rear axle, and driving the tractor away. Changing from cultivating to mowing also is a quick and easy job.

The tractor is provided with a power take-off shaft extending lengthwise of the frame inside the transmission housing and driven from the clutch shaft (the primary shaft of the transmis-



The Case is an all-purpose tractor and the rear wheels have a variable tread of from 48 to 84 inches



The LeTourneau Cradledump Buggy is a new type of dump body operated by the engine power from the driver's seat

sion) by spur gears. Near its rear end this shaft carries a worm which meshes with the worm wheel of the power lift. The power take-off is controlled by a separate friction clutch

which is engaged and disengaged by means of a hand lever. It operates at a speed of 535 r.p.m. regardless of the gear in which the tractor may be working.

ment, and a gasoline-engine starter are found also. The wheelbase is 135 in.

Returning to the "Buggy," it has a 30-cu. yd. capacity when loaded flush and approximately 35 cu. yd. loose measure. Inside body dimensions are 9 by 13 ft., these large dimensions making it unnecessary to spot shovel buckets accurately when loading it. Unloading is controlled from the tractor-driver's seat by means of ½-in. steel cables and sheaves connected to

LeTourneau Cradledump Is Operated from Driver's Seat

TRACTORS are used to quite an extent in road building and general construction work, including both the type descended from the farm tractor and that related to the motor truck. In such work the four-wheel drive tractor has special advantages, and some manufacturers of this type have specialized in road-building and maintenance equipment to a large extent. A comparatively new piece of equipment for this purpose is the Cradledump Buggy, an earth-moving carrier of 30 cu. yds. capacity, manufactured by R. G. LeTourneau, Inc., of Peoria, Ill. It is essentially a semi-trailer built for use with large tractors, and the Hug Model 100 tractor truck was developed to handle this job.

This tractor truck is powered with a Caterpillar Diesel six-cylinder engine of 5¼-in. bore by 8-in. stroke, which delivers its power through a four-speed transmission built-in unit with the engine, the fourth speed being an overdrive. From the transmission the power passes through a three-speed transfer case providing one direct drive, one over-drive and one under-drive, so that there is a total of 12 forward speeds available, as well as three reverse speeds. The final drive is through both the front and the rear axle, the front axle being of the double-reduction full-floating type equipped with a high-traction type of differential. The reaction to



The LeTourneau has a range of 12 forward and three reverse speeds

the driving torque on both axles is taken on torque rods.

Equipment includes Westinghouse air brakes on all four wheels, independent wheel brake control, Hug front-axle rocker action, a cam-and-lever steering gear. Westinghouse air steering, a welded frame of 9-in. I beams, large size heavy-duty pneumatic tires, single in front and dual at the rear, electric lighting equip-

a standard two-drum power-control unit mounted at the rear of the tractor engine. The body is pivoted at the top and expels its load by moving in a cradle-like arc to the side, forcing the entire load off the Buggy as it moves. One line from the power control unit controls this dumping process, the other line returns the body to the loading position and holds it there.

I.H.C. Diesel Powerplant Sealed Against Entrance of Dirt

THE International Harvester Company at present manufactures both wheel and crawler tractors, the

former in the conventional and the all-purpose types. This company developed a Diesel engine of its own design which can be started on gasoline as a carburetor-type engine and after a few explosions automatically changes over to operation on heavy fuel on the Diesel cycle. A general description of this engine with illustrations was printed in *AUTOMOTIVE INDUSTRIES* of Nov. 24, 1934, and it is therefore unnecessary to describe it here. It may be of interest, however, to give here some points on the provisions made to keep dirt out of the fuel system, to prevent dirt from getting into the engine with the intake air, and to seal the engine against dirt. These points are taken from a paper presented at Iowa State College last spring by C. B. Jahnke of the Engineering Department of the I.H.C.



The International Harvester Co. makes both wheel and crawler type tractors. The one shown here has a windrow-harvester attached

Field experience has shown the need of a water trap in the fuel line between tank and injection pump. The greatest difficulty was experienced in extracting the water which was in a state of emulsion with the fuel. This was accomplished by employing the principle of intimate surface contact between liquid and metal, the difference in surface tension of globules of fuel and of water, and by low velocity up-flow of the fuel stream.

After passing the water trap, the fuel is ready for the supply pump. It is delivered under a regulated pressure of 25 lb. per sq. in. and passes through a large area of virgin wool triple-weave cloth at the rate of one gallon per minute per 1000 sq. in. of cloth. The fuel then flows through a bronze edge filter having 0.0015 in. spacing. It is now delivered into the injection pump supply gallery.

To insure continuous operation of the injection pump, a 0.003-in. jet-type filter is used at each suction port above the suction valve. This filter is intended mainly to exclude dirt from the pump and nozzle which may get into the system while it is being disassembled and inspected. It is extremely difficult to keep dirt out of the system when the disassembling and inspecting is being done in the field or on a construction job. A jet filter of the same type but with 0.001 in. spacing is used in the injection nozzle.

Further insurance against trouble from solid particles in the fuel-injection apparatus is afforded by complete rust-proofing of all parts of the apparatus and the use of hardened and corrosion-resistant alloy steel for all moving parts in contact with the fuel.

Owing to the fact that in a Diesel engine the air inlet is never throttled, and the vacuum in the inlet pipe or manifold therefore is quite low, a larger air filter, in the ratio of 5 to 3, is required than for a gasoline engine of equal displacement. More effective filtering is also desirable, because such siliceous dirt as may pass the filter and deposit on the cylinder walls, will cause more rapid cylinder and sleeve wear in the Diesel engine, due to the higher gas pressures.

Recent development of the air filter has made it possible to operate effectively when tilted to 35 deg., so its effectiveness is no longer impaired on steep grades. The latest types of filter are also non-clogging when operating in an atmosphere carrying large percentages of chaff, such as is met with when operating a harvester combine.

Since the induction system between the air filter and the engine is always at a pressure below atmospheric, it is very important that there be no leaks between engine and filter through which dirty air could enter the clean-air stream. A 1/32-in. hole would al-

low enough dirt to enter the engine to wear out the cylinders, piston rings, crankshaft, and bearings in a few weeks' time.

In 1934, owing to the extreme drought of that year and the resulting dust conditions, the wear of working parts of all gasoline and Diesel engines used for agricultural and industrial purposes was materially increased. Engines which up to that time were considered properly sealed against the entrance of dirt, were found to be insufficiently protected under the unusually severe conditions encountered that year. This problem of protecting the engine parts is different from that of cleaning or filtering the air of combustion. It has been the general experience that at points where oil leaks from the engine, dirt will eventually creep in. At all points where shafts project from the engine housings it is necessary to employ a positive resilient pressure-sealing device. With a rotating shaft it is further necessary to use a close-fitting felt seal ring set outside of the pressure seal in order to exclude dirt which might become imbedded in the pressure seal, and thereby cut the shaft. The pressure seal made of leather is satisfactory at temperatures below 200 degrees F., but at higher temperatures a special heat-resistant seal material must be used.

Ignition and Flame Formation in Diesels

Zündung und Flammenbildung bei der Diesel-Brennstoff-Einspritzung, by Dr.-Ing. Otto Holfelder. Published by VDI Verlag, Berlin NW-7, Germany.

THIS is a research report of the German Society of Engineers (No. 370) and deals with ignition and flame formation in Diesel engines with mechanical injection. A bomb was secured to the cylinder head of a stationary single-cylinder Diesel engine and a mass secured to the piston head so that the compression space was almost entirely in the bomb. This bomb had long slots in opposite sides, so that photographs could be taken of flame inside of it. The Diesel engine was used merely as air compressor, being electrically driven. By means of a stroboscopic apparatus, photos of the interior of the combustion chamber could be taken at the rate of 500 per second. An oscillograph in conjunction with a piezo-electric pressure element served to trace time-pressure diagrams, and time-temperature diagrams were also constructed. Various Diesel fuels were in-

vestigated under different conditions of injection. The flame became visible first in the envelope of the spray jet not far from the nozzle, from where it spread quite rapidly to all of the fuel already in the chamber. It is stated that ignition delay can be determined more accurately by a direct observation of the

flame than indirectly by measurement of pressure or temperature. The dependence of ignition delay and the form of flame propagation on the density and temperature of the air were determined and charted. Another factor investigated was spray motion during the period of combustion.

Trade Literature Available

"Optical Aids in the Metal Working Industry" is the title of a bulletin recently issued by Bausch & Lomb Optical Co., Rochester, N. Y.

The Foxboro Co., Foxboro, Mass., has a new 20-page catalog covering its complete line of potentiometer and resistance thermometer controllers. A number of suggested wiring diagrams are included.

A comprehensive discussion of the

bearing problems of machine spindles, and of the types of extra-precision ball bearings required in such application is covered in a new bulletin just issued by the Fafnir Bearing Co., New Britain, Conn.

The Evaluation of Glare from Motor Car Headlights, Illumination Research Technical Paper No. 16. Price, 50 cents. Obtainable from The British Library of Information, 270 Madison Ave., New York.

WOOL is produced by a variety of breeds of sheep, under varying conditions of climate, soil, feed, water and health. There are considerable variations in the length and fineness of the wool from one sheep.

The wide variations due to the influence of different environments on growth first become evident when the wool is scoured. One hundred pounds of raw wool may yield as little as 25 lb. and as much as 65 lb. of clean wool, depending on the amounts of wool grease, perspiration, dirt or other natural or accumulated substances in the raw product. The clean wool may vary in length from 3 in. to 14 in. and in fibre diameter from about 0.004 in. to 0.030 in.

Further evidence of variations is found in the chemical constitution. Wool is a protein and is classified as a keratin—along with horn, finger-nails, hair, etc. Its exact chemical constitution is now known, and in fact, its chemical composition is indefinite, since different samples vary in amounts of important chemical constituents.

Thus the textile manufacturer is not in the same position as the steelmaker, for instance, who can produce a batch of steel which matches previous batches with exactness. The former must take as large a lot of wool as possible, and by various mixing steps throughout manufacture, produce a lot which has an average of the properties of all the varieties with which he began. True the textile industry also uses specifications, but the limits established cannot be as close as those maintained in metallurgical work.

Here are a few typical specifications:

WOOL

Grade of wool. From coarse to fine there are about ten major grades with several sub-divisions. It is often also designated as to its geographic origin.

Yarn

Counts of yarn. This is a measure of the size of the yarn. There are several systems for expressing "counts," but they are all based on a certain number of yards per pound. The greater number of yards giving a higher count are, therefore, a finer yarn.

Twist—Fibres which lie parallel slip along each other with little resistance. It is by twisting that the fibre bundles are prevented from slipping, and this gives strength to the yarn. Number of

turns of twist per inch, and whether a right or left twist, are specifications in yarn construction.

Ply—Yarn may consist of one strand, known as one ply, or it may consist of two or more strands twisted around each other.

CLOTH

Ends and Picks. Cloth construction is based on the number of "ends" or threads of warp yarn, and number of "picks" or threads of filling yarn per linear inch.

Weight—Cloth is constructed so that for a given width, one linear yard will weigh a given number of ounces. Because of the fact that in scouring, dyeing and other cloth finishing such as

and as much as 1,500,000 lb. of raw wool has been scoured per week—the annual product of 200,000 sheep.

As soon as the first few pounds of raw wool have passed through the soap and alkali solutions, the problem with variables begins. Water-soluble salts, insoluble sediments, loss in detergent value, increase in the accumulations of wool grease, fluctuations in the pH, and variations in conductivity and temperature must be controlled. The temperature is controlled thermostatically; schedules for additions of soap and alkali have been carefully worked out for each type of wool; counter-current flow of scouring liquors assures economy; and definite efflux of the dirtiest liquors tends toward constancy of water solubles and insolubles. The pH is held within reasonable limits. Conductivity control is under study. The finished product is rinsed free from soap and alkali. Laboratory tests are made for grease content of the scoured wool to check production.

Certain types of fabrics contain a small percentage of vegetable matter in the form of burrs, straws, etc., which adhere tenaciously to the wool fibres throughout the process of manufacture. It is sometimes necessary to remove them by carbonizing. The pieces of cloth are immersed in a 3 per cent solution of sulfuric-acid.

The most interesting recent develop-

drying and pressing, there are certain shrinkages and stretchings in length and width, depending on the fabric construction and just what treatments it receives. The width, length and weight are specified as off the loom, as finished, and oftentimes as of various intermediate stages.

Other cloth specifications may include

The Transformation of for the Manufacture of

any or all of the following items:—shade; pattern; tensile strength both warp-wise and filling-wise; fastness of color to washing, light, salt water, fresh water, perspiration, croaking, etc.; finish; moisture content and oil content. Each one of these properties or specifications brings numerous problems of control in manufacture.

The first physico-chemical treatment to which the wool is subjected is during the wool-scouring process. From 1000 to 1500 lb. of raw wool is scoured per hour, in one train of bowls referred to as a wool-washing machine. There are ten of these wool-scouring machines at the Wood Worsted Mills,

ment has been the automatic recording and controlling of the strength of the sulfuric-acid in the tank in which the cloth is saturated. Formerly the strength was checked by means of a hydrometer. Additions of acid were made from a dipper and stirred in with a hand paddle. The strength of the acid in the bath is now determined by electrical-conductivity measurement. A continuous record is kept, and a valve in the acid feed line is automatically opened and closed to maintain constant conditions. The bath is kept uniform by agitating it with compressed air.

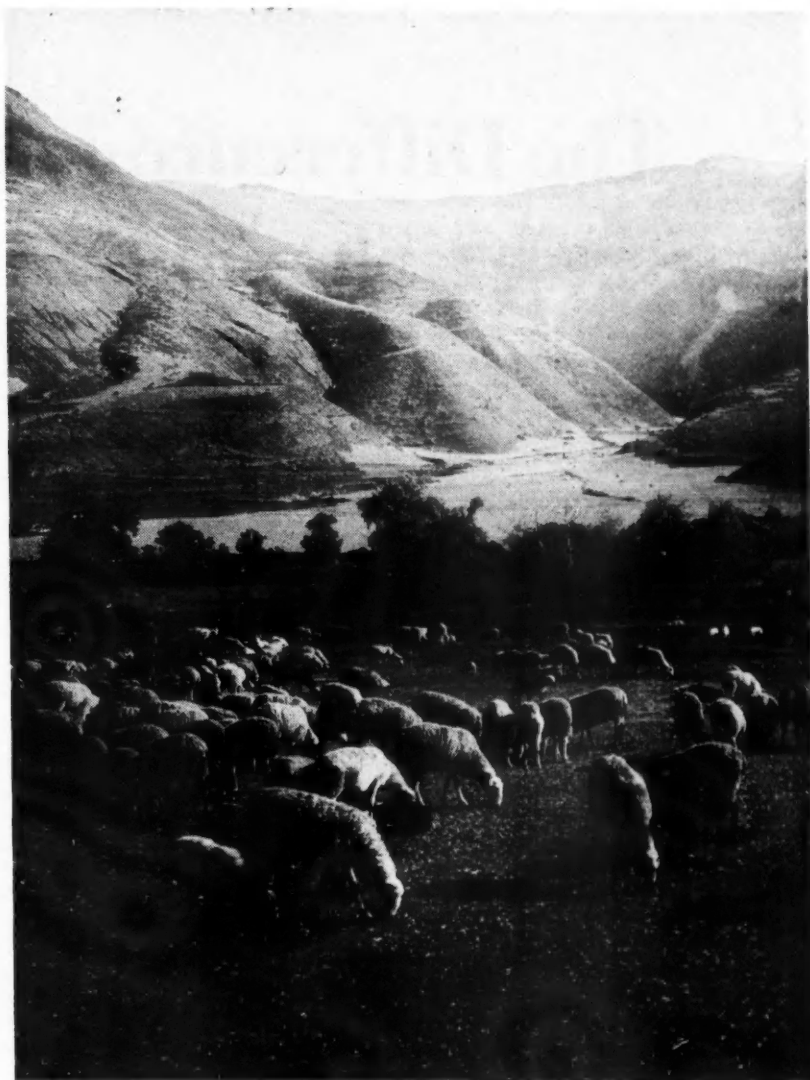
*Paper presented at a meeting of the S.A.E. Detroit Section, slightly condensed.

Although the dyeing of textiles has perhaps received more technical and scientific study than any other phase of processing, there is still a great deal to be learned about the fundamentals and control of the variables. Variation in shade is still a major problem.

The important factors of time and temperature have been placed under control. The time necessary to raise a kettle-load of pieces from water temperature to the boil can be set, and the temperature rise made uniform by thermostatic valve control. The length of time at the boil is controlled in a similar manner.

Metal kettles of stainless steel, monel metal, etc., have eliminated the hazards of wooden kettles in dyeing light shades. Some coloring matter is always absorbed by the wood, which seems to take particular delight in releasing it again when light shades are being dyed. Metal kettles do not absorb color and do not become stained.

The fastness to the requirements of manufacture and wear are determined on each dyestuff before it is used. Unfortunately, classifications for fastness can be determined only by comparison with something else, which has become a standard by continued use. Fastness may be characterized as poor, moderate, fair, good and excellent, but what may have been considered excellent by yesteryear's scale, may be only



of Wool Variables into Constants of Automobile Upholstery Fabrics

fair in comparison with some new product from today's dyestuff laboratories. A dyestuff which may be of excellent fastness to light when dyed in a heavy shade, may be only of moderate fastness when dyed in a light shade, while the reverse may be true as regards its fastness to washing.

Every package of dyestuffs and every shipment of chemicals is tested in the laboratory, to make sure it is up to standard before use. The human eye is still the only final authority in shade matchings. Various color-matching machines and contrivances have been devised, and although the attempts to produce such machines are laudable,

all of those so far available lack the comprehensiveness of the eye.

I recall an old practical boss dyer by the name of Pat. As a batch from a kettle nearing completion was brought into his office to match against the standard, Pat would shift his cud of chewing tobacco, direct a well-aimed shot at the radiator, take a squint at the sample and standard, and call out, "Add a pinch of yellow to No. 6 and a small pinch of red—make it a large pinch of yellow."

Although large pinches and small pinches are now more definitely designated in terms of ounces and grains, and although every formula is now

carefully recorded and filed, instead of being carried "under the boss dyer's hat," it is still impossible to measure a shade numerically, and determine numerically just what must be added to make it match the standard. The same formula, under what seems to be identical conditions in the same kettle, will not necessarily produce the same shade exactly on successive batches. It sometimes happens that pieces dyed together in the same kettle, absorb the dyes at different rates, and finish different shades. Pattern, weave and finish alter the optical effect of the shade. Prior processing introduces variables which

(Turn to page 385, please)

The Difference in Braking Forces Should Be Governed by the



Photo by: Howard Kohlbrenner, Chilton Co.

IN a paper by B. B. Bachman of The Autocar Company, recently presented before the S.A.E. Baltimore Section, the author discussed—among other problems—that of the division of braking force between front and rear brakes of trucks. In these vehicles the weight distribution between front and rear wheels is generally far from being equal, and to prevent locking of the front wheels when the vehicle is light, the force of application of the front-wheel brakes must be limited.

Weight distribution varies not only with chassis design but also with other factors. For instance, the chassis may be provided with a body which is either exceptionally short or long. In the first case there will be too great a load on the front wheels, in the second too little. In the case of tractors it is usually difficult to get much of the pay-

load on the front axle, and brakes arranged for truck operation will be too severe for the front wheels of a tractor. At Autocar it is the practice to study each order and to adjust the brakes, as well as the tire size and the spring capacity, to the conditions under which the truck is to operate. While this plan may be difficult of application where trucks are being turned out in large numbers, the buyer, if he recognizes the problem, can have a satisfactory adjustment made by brake-service specialists with the necessary equipment and experience.

Having determined the fluid pressure necessary in a hydraulic brake, or the torque at the camshaft in a mechanical brake (with the aid of formula given in the paper), it is next necessary to determine the means by which the force needed to develop this pressure or torque can be applied. The

first method to be considered is, of course, a system of levers by which the effort which can be applied by the driver can be used.

To determine the value of the needed force we can use, for a hydraulic brake, the following:

$$PP = \frac{P \times A_c}{L \times E_l} \dots (1)$$

Where PP = Pedal pressure in lb.

A_c = Area of compensator cylinder in sq. in.

L = Ratio of reduction in system of levers

E_l = Mechanical efficiency of system of levers

In a mechanical brake, this can be changed to—

$$PP = \frac{N_f \times T_f}{L \times E} + \frac{N_r \times T_r}{L \times E} \dots (2)$$

When N_f = Number of brakes on front wheels

N_r = Number of brakes on rear wheels

T_f = Torque in front brake camshaft in lb. in.

T_r = Torque in rear brake camshaft in lb. in.

A pedal pressure of 300 lb. can readily be applied by a man of even moderate strength, but it is obvious that the time necessary to apply such an effort will be greater, and the necessity for doing so will increase fatigue. For this reason the Brake Committee has suggested a maximum pedal pressure of 200 lb. for trucks and buses.

If there were no need for limiting the value of L in (1) and (2), it would be possible to make the pedal pressure as small as we please. There is a very definite limit, because of the practical limit on pedal travel, and if the reduction between the pedal and the brakes is made too great, it will be necessary to make frequent adjustments.

The pedal travel should never be greater than 12 in., and the ratio between the pedal travel and the movement of the end of the shoe not more than 60 to 1. These are maximum figures, and a reduction of the pedal travel to 10 in., or, better still, to 8

Between Front and Rear Distribution of the Load

in., will produce greater speed and surety of brake operation. Unfortunately, when the pedal travel is reduced, the ratio of pedal travel to shoe movement also is lessened to 50 to 1 for a 10-in. travel and to 40 to 1 for an 8-in. travel. This ratio is established by the necessity for making allowance for the following:

- A. The brake shoes must have clearance to prevent dragging.
- B. The brake lining will compress in some degree.
- C. The brake lining is not in solid contact with the shoe, and this clearance, however slight, must be taken up.
- D. The brake shoe will deflect.
- E. The brake drum will expand.
- F. Allowance must be made for wear of the lining and drum.

Mr. Bachman said that at Autocar 0.10 in. had been established as a practical value for the sum of these allowances. At the end of the shoe this value will be doubled and therefore will be 0.20 in. These figures apply to the conventional two-shoe brake. The same general principle applies in the case of brakes of the Bendix type, but the values will be different.

When these factors are given adequate consideration, it will be found that with a vehicle weight of 12,000 lb. it is desirable, and on heavier vehicles necessary, to provide for power assistance or full power application. Vacuum boosters and air brakes were discussed in this connection.

In a vacuum system an effective pressure of 10 lb. per sq. in. can be obtained.

The system may be built either as an air-suspended or a vacuum-suspended system. In the first, the power cylinder is open to the atmosphere and subject to atmospheric pressure until operation of the valve to apply the brakes places one side in communication with the suction means. Then, when the valve is released, suction is shut off and air flowing in returns the pressures to a balance, permitting the release of the brakes. One difficulty with this system is to get sufficiently large passages through pipes and valve to eliminate lag; another is that with the larger cylinder, dumping a large

volume of air into the inlet manifold, causes trouble with the carburetor.

In the vacuum-suspended system, the cylinder is exhausted until the valve is operated to apply the brakes, when air is allowed to enter one side and then, when the valve is released, is again exhausted so that a balance is established which allows the brakes to release. This system has been found to be more rapid in action and to cause less carburetor difficulties.

Originally the vacuum booster, as the name implies, was designed to merely assist the driver and was applied in such a way that if it became inoperative, the driver could apply the brakes without its assistance. Obviously such an arrangement has many desirable features. However, a little reflection shows that it is not easy to fully realize its advantages. If the ratio of booster assistance is kept low, the driver finds that it is necessary to help by his own efforts so frequently that he is dissatisfied; on the other hand, if the ratio is made high, if the booster fails, the pedal leverage is so small that one might almost as well push against the floorboard. Fortunately, the development of the apparatus has made it so dependable that it is no longer necessary to pay much attention to the manual part of the operation and Autocar provides booster power sufficient to give 100 per cent braking. Of course, in an emergency, the driver can still add to the brake power by pushing the pedal, but it has been found desirable to limit this addition to the rear brakes.

For a satisfactory installation the pedal travel and booster travel must be equal. It can be seen that if the pedal travel is shorter than the booster travel, the full booster travel can not

be used, and this mistake is not common. But if the pedal travel is greater than the booster travel, the driver will frequently go through the booster. This mistake is often made when the booster ratio is low, as referred to above. In the attempt to get a softer pedal a lever is lengthened, which increases the booster power, but throws the pedal travel out and then trouble is encountered. The only proper remedy for such a condition is either to change both pedal and booster connections so as to keep them in proper relation, or to put in a large booster. If the first method is used, the follow-up is sacrificed and the brake will have to be adjusted more frequently; and if follow-up is on the low side to start, it may be found impossible to use this alternative.

The air brake as generally used is a full power system. Air pressure is usually applied by means of a diaphragm, the pressure used being around 80 lb. per sq. in., with a maximum of 110 lb. in the tank. As the force available is the product of the pressure and the area of the diaphragm, this must be balanced with the torque needed on the camshaft by using levers of proper length. At the same time, as the diaphragm movement is limited, the lever must be made of a length which will permit of the proper follow-up.

One very important advantage of both the vacuum booster and the air system is that they lend themselves readily to the operation of brakes on trailed vehicles—a feature of great value from the standpoints of safety and improved control.

Brakes should be made as large as space limitations permit. The means of control should be arranged to provide sufficient power, and if this cannot be accomplished by a mechanical leverage, which will allow the driver to control the vehicle with comfort and surety, then a power system should be added.

B. B. Bachman discusses modern truck braking problems. Sets 12,000 lb. as gross-weight limit at which power braking becomes desirable.

The Horizons of Business

by Joseph Stagg Lawrence

Background for Corruption

ON the twelfth day of August, 1935, the Senate of the United States, without the formality of a roll call, passed S. 3055, more commonly known as the Walsh bill. The proposed statute now rests in the House Committee on the Judiciary. It describes itself with disarming innocence as "a bill to provide conditions for the purchase of supplies and the making of contracts, loans, or grants by the United States, and for other purposes." The stated purposes seem to fall entirely within the appropriate authority of the Federal Government.

A Dead Chicken

Let us look this bill in the eye. On May 27, 1935, the Supreme Court passed judgment on the case of a Brooklyn chicken dealer against whom the Federal Government had brought action. In one of its myriad codes the Government had attempted to regulate the business of one Schechter. On the ground that the chickens which Schechter killed and sold were previously transported in interstate commerce, Uncle Sam assumed that he had the right to determine the wages which Schechter should pay his workers, their hours and sundry other matters related to the business. All this under the National Recovery Act. The nine justices of the court laid the statute alongside the Constitution. As referees in the great game of government they tooted their judicial whistles unanimously and declared Uncle Sam out of bounds. He had no authority under the fundamental law to tell any business man what wages he must pay or how many hours his workers might toil.

The Pot vs. the Kettle

During the past three years we have heard a great deal about the tortuous morals of big business. The "money changers," "entrenched greed," "corporate turpitude," have all received generous attention in the comments of our statesmen. The record positively

bulges with statutes seeking to purify and elevate business morals. When the argus-eyed servants of the public discover a corporate malefactor who seeks to accomplish indirectly what the law forbids, the Capitol shakes with righteous indignation. We know what happens in the field of sport when an individual or team disregards the decision of an official or seeks to accomplish by subterfuge what the letter and spirit of the rules forbid. The offender is disqualified. If the offense is sufficiently flagrant he is barred from competition.

Cricket

Any appraisal of Government conduct upon sporting or other equitable criteria produces appalling reflections upon its own ethical standards. Nothing illustrates this more aptly than the Walsh bill. Here we have a fundamental set of rules whose wisdom has been universally acclaimed for a century and a half. These rules grant certain authority to the Federal Government. Another field of authority is allotted to the states. Anything not covered by enumeration for Uncle Sam or by denial to the states is reserved for the people. These are the rules of the game. Nine distinguished, detached, mature jurists are the referees. With no more exceptions than you can count on the fingers of one hand their decisions have been accepted by various Administrations without question. Assaults upon the court or scurrilous reflections upon the character of its members have generally been confined to the eccentric or radical fringes of the community.

Ganging Up

In the Walsh bill the Senate of the United States virtually "gangs up" on the Supreme Court and the Constitution. This is what the bill seeks to accomplish:

1. Every contract between an agency of the United States and a private party, individual or corporate, must

contain provisions for the hours and pay of the codes which the court has declared invalid.

2. Every signatory to such a contract must pledge himself to deal only with such sub-contractors and purchase supplies only from such persons as shall in turn comply with the invalidated codes.

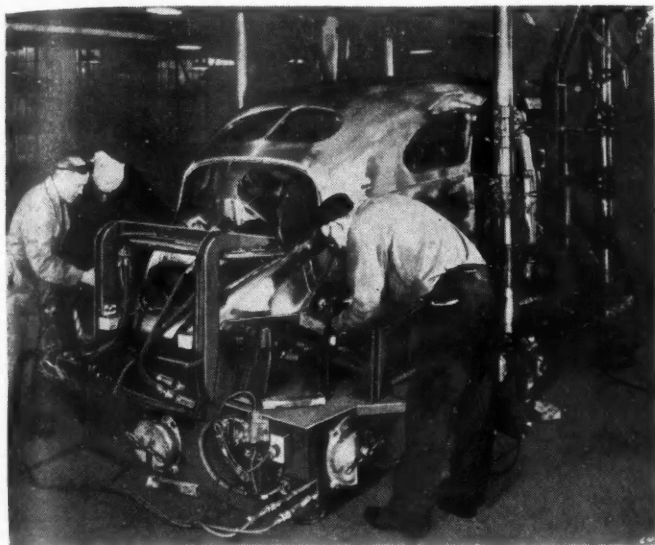
A Lot of Territory

This covers a lot of territory. The "agencies of the United States" include all the departments of government, the RFC, the Federal Reserve banks, the CCC, the WPA, the FDIC, the ICC, the FTC, etc., etc. Let us see what this means. The Navy Department is clearly an "agency of the United States." It calls for bids to build a battleship. The successful bidder, to qualify, must pay the wages and observe the hours in force under the NRA. As a steel manufacturer, he needs coke. This must come from ovens operating under NRA rules. It may be shipped only on carriers which observe the NRA. The steel company has administrative offices which use stationery, typewriters, accounting machines, rubber bands, water coolers. All these must come from firms which operate under the NRA.

The Federal Deposit Insurance Corporation, as the name implies, insures the greater part of the country's bank deposits. It is an "agency of the United States" within the meaning of the statute. Presumably its obligation to the depositors of any bank would become null and void the moment the bank did any business with an employer who failed to respect the NRA.

Re-enactment

It is unnecessary to labor the application and far-reaching ramifications of this bill any further. It is a bald effort to circumvent the decision of the referee. Under it the bewildering and fantastic canopy of the NRA would again spread over the business of the country. The opportunities for blackmail, bribery and persecution under this bill are infinite.



Final welding operation on the Lincoln-Zephyr bodies at the Le Baron plant in Detroit

PRODUCTION LINES

Better Plate

This year's experience of new cars going through their first winter immediately, has reopened the matter of better bright-plating finish. Despite the progress made in recent years, it is still a fact that bright-plated areas are the worse for wear and tear after a hard winter. We understand that one of the car manufacturers is about to change his plating specs to the extent that he will use only a flash of copper and rely upon an unusually heavy coat of nickel for corrosion resistance. This will be topped off, of course, with a flash of chromium.

Valve News

Two items of interest on the valve front have reached our ears recently. One is that a prominent valve maker is about to announce a Stellite-faced valve to match the durability of hard valve-seat inserts. The other item is that a real old-timer of the industry is coming into the valve picture and will soon be set up to produce valves for the industry, particularly in the replacement field.

Consider the Pull

With several large companies in the passenger car trailer field actively pushing the use of portable living quarters, it is perhaps time for the passenger car engineer to study the situation thoroughly. Here is a sizable piece of equipment that must be hitched to the rear end of the car. It seems to be in the public interest to consider the most suitable way of hooking up the

draw-bar; and passenger car builders may find it desirable to design a bracket either as a standard fitting or as an optional part available through the dealer and jobber. At least this would provide a definite and acceptable mounting and thereby assure the safety of the car owner.

This might lead eventually to a standardized mounting and even a standard trailer draw-bar which might be produced by some of the replacement parts makers and distributed through the retail channels.

Quality Control

On occasion we have had considerable to say about the growing movement to apply statistical theory to engineering and research problems and particularly to all problems involving quality control. In this country W. A. Shewhart and his associates at the Bell Telephone Laboratories have made the most significant contributions.

Now comes a new British book—The Application of Statistical Methods to Industrial Standardization and Quality Control — sponsored by the British Standards Institution. It was written by Dr. E. S. Pearson, University College, London. The author shows why the technical man and statistician should join forces in applying the methods of quality control. His exposition is simple and direct, using the case method to show how typical problems can be solved and indicating the tools that may be employed by the engineer for this purpose.

Greatest emphasis is laid on the use of control charts to indicate whether

the process is really under control. Such charts are of vital importance not only to the producer but as a means of proving to the purchaser that the product is under control. In many cases, particularly where incoming inspection involves the use of destructive testing, this device can cut inspection costs materially.

The book runs some 161 pages, profusely illustrated, and may be ordered through the library of the American Standards Association at \$1.75 a copy.

Costs Less

Big things are expected of a new installation of E. F. Houghton's Perliton liquid carburizing process. Right now it's being used in one of the biggest metal working establishments in Detroit for the case carburizing of miscellaneous small parts. Case penetration ranging from 0.012 to 0.020 in., depending upon the specification, is produced in from 1 to 2½ hr. When you compare this time cycle with the usual requirement of 5 to 7 hr. you have some idea of the real economy that this new process seems to offer.

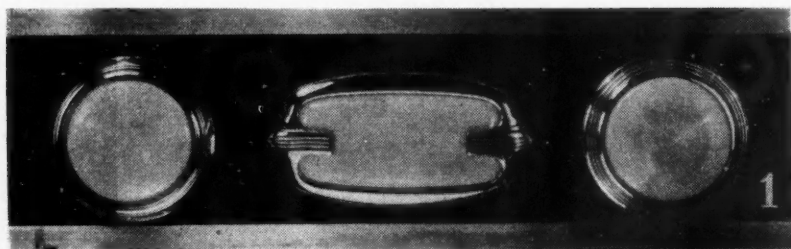
Truck Lube

Fleet operators will be glad to hear that there are big doings along the oil filter line. Several of the most important and best equipped manufacturers have developed oil filters for heavy-duty service and may be ready to announce very soon. One of these is a newcomer in the truck field and expects to have something real hot for the first effort.

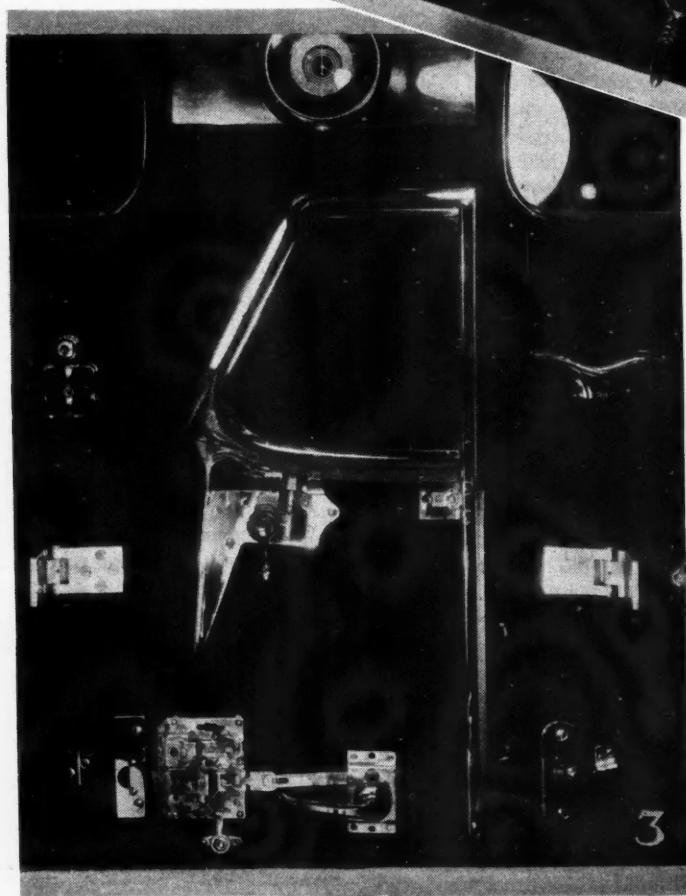
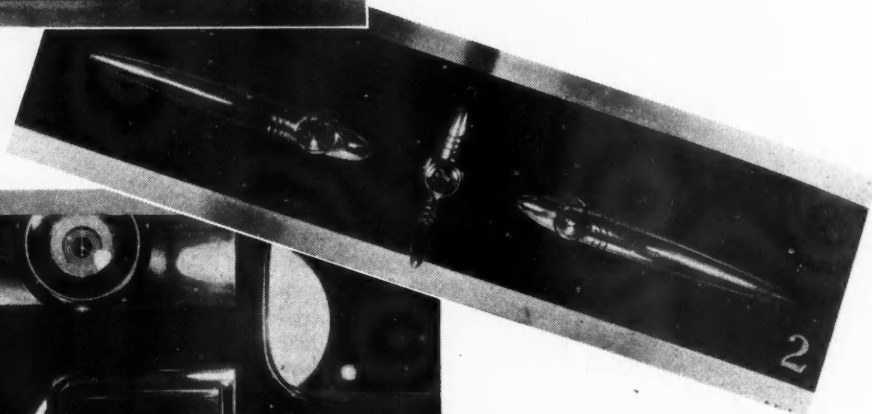
—J. G.

MANUFACTURING
MANAGEMENT
METALLURGY

Fittings by Ternstedt for 1936



The hardware for all Fisher bodies is produced by the Ternstedt Division of General Motors. Here are a few of the very latest.



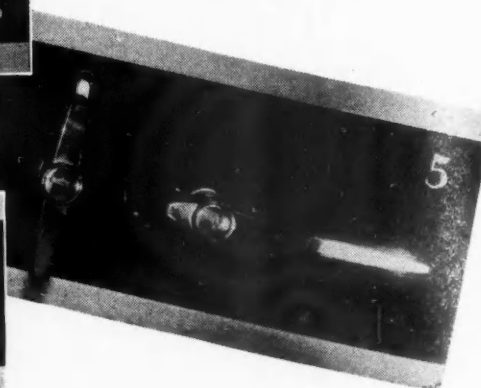
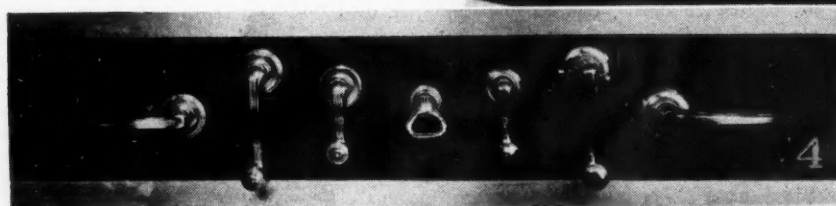
1.—The dome light in the center is used in the 90 series Buick, the one on the right in the Buick 60 while to the left is the one used in the Cadillac 60

2.—These handles are used on the new Cadillacs and have a theft proof feature

3.—A few of the Ternstedt creations for Fisher bodies

4.—This display of interior fittings is all chromium plated. The three at the left are for the Buick 60, 80 and 90 series. The fitting for the assist strap in the center is for the Buick "Limited" while the three at the right are for the 1936 LaSalle line

5.—These door handles have automatic covers for the keyholes to keep out water and dirt. They are used on the new LaSalle models

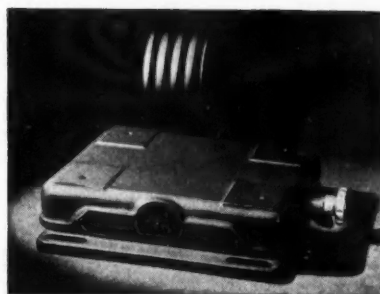


NEW DEVELOPMENTS

Automotive Parts, Accessories and Production Tools

Belt Tension Automatically Maintained

For use with the motion control vari-pitch texrope sheave recently announced, the Allis-Chalmers Co. has designed the straitline automatic ball-bearing motor base illustrated. It provides a convenient place from which to operate the vari-pitch sheave and maintains a uniform belt tension throughout the speed range adjustment. A dial indicator on the base shows the operator the tension of the V belts at all times. A handwheel controls the speed of the vari-pitch sheave and simultaneously moves the motor a sufficient amount to compensate for the change in centers between the shafts, thereby keeping the belt tension constant. The Allis-Chalmers Mfg. Co. is located in Milwaukee, Wis.



Ball-Bearing Motor Base

will show whether articles which have the same appearance actually have the same color.

The instrument consists essentially of a monochromator, photoelectric photometer, and a means of recording their respective indications. Using a phototube, it is said to have ample sensitivity at the violet end of the spectrum where visual spectrophotometers some times fail because of the low visibility of violet light.

One of the important uses for this machine is the cataloging of the curves of different dyes and pigments, so that new colors with predetermined characteristics can be obtained at any time by the proper mixture of standard colors. The equipment has been developed by General Electric Co., Schenectady, N. Y.

Spectrophotometer Analyzes Colors

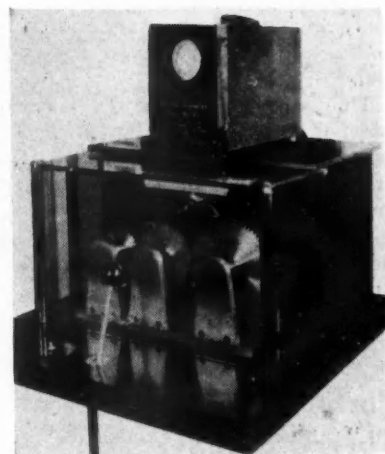
The new General Electric recording photoelectric spectrophotometer is said to make it easy to obtain quickly and accurately, an analysis of the color of any material. The material to be examined is placed in the instrument, operation is started, and in a few minutes the operator can remove a chart showing exactly how much of each wave length of light is reflected or transmitted by the sample. Every color has a multitude of variations, and comparisons of charts from different samples



Records Colors
on Chart

Noise Made Visible

A visible comparison of gear noises produced by gears of different material, is now possible through the use of a Noisometer developed by the Synthene Corporation of Oaks, Pa. This device consists essentially of two parts, a cathode ray oscillograph and a train of spur gears, so arranged that through a shift lever, either of the two gears being compared can be thrown into mesh while running. On the panel back of the gears is mounted a microphone, and noises generated by the gears are picked up and relayed to the cathode ray oscillograph mounted on top of the



Checks Noisy Gears

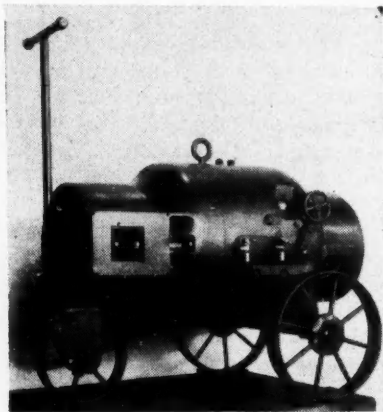
cabinet. Noises are reproduced as a pale green line on the screen, the amplitude of the wave representing the volume of the noise.

Cross Field Generator Improves Welding

A new control principle for arc welding sets, giving a practically constant current volt-ampere curve, is employed in the Westinghouse equipment illustrated. This new generator is said to employ but few parts, having two poles instead of four and four field coils instead of the usual 8 or 10. No exciter, brush shifting devices, reactor, rheostat and starter coil are used. A handwheel on the side of the set is turned to adjust for any desired cur-

NEW DEVELOPMENTS

Automotive Parts, Accessories and Production Tools



Handwheel regulates welding current
rent, and the current for which the machine is set is indicated on a large dial.

This generator is said to be unaffected by changes in speed, so that the operator will not notice fluctuations in the supply line. A wide range of current adjustment is provided, it being possible to use either a 1/16 or 3/8 inch electrode with a 400 ampere generator. This welder has been developed by the Westinghouse Electric & Manufacturing Co., East Pittsburgh, Pa.

Portable Worm Thread Grinder

The new Hisey portable worm thread grinder is made in three sizes, 1, 3 and 5 hp. Handwheels are provided for cross-feed adjustment, horizontal adjustment and for raising and lowering the grinding spindle, while a crank, operating through a worm and worm gear, affords angular adjustment of the complete grinding head. A universal wheel dressing attachment can be furnished for retrueing bevel and straight face wheels. It is provided with a screw feed adjustment and graduated so that it can be accurately set at any angle.

The Hisey grinder is a product of The Hisey-Wolf Machine Co., Cincinnati, Ohio.

Automatic Chucking Machine Electrically Controlled

A feature of the model RP National Acme automatic chucking machine is

the electric control. A push-button station permits control of the electric chuck, so that the operator with one hand can close or open the jaws at will. Another electric control provides for rotating the spindle independently of the main drive to check for run out. While the operator is chucking one piece, the tools are at work on the other spindles, and at the end of the cycle a starting lever is pulled which automatically engages the spindle which has just been loaded, and the carrier indexes to the next operating position.

This new machine which has been developed by The National Acme Co., Cleveland, Ohio, is available with either 4 or 6 spindles. All shafts are mounted on anti-friction bearings and run in a flood of oil.

Press for Plastics And Rubber Molding

The new Farrel-Birmingham 100-ton press is designed especially for plastics and rubber molding operations, although readily adapted to other work. Oil is used as the fluid medium and the variable displacement pump with its driving motor is mounted on a steel bedplate over the top crosshead, the crosshead also serving as an



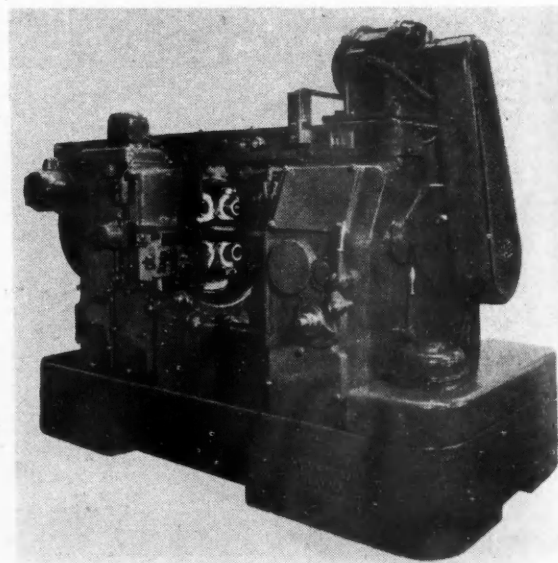
100-ton hydraulic press

oil reservoir. The usual tie rods between the top and bottom crossheads are dispensed with, and, instead, rolled steel slabs are used as tension members.

The bottom crosshead is integral with the cylinder, which contains the hardened and polished ram. The operation of the press is said to require the opening or closing of but one valve, and maximum pressure adjustment of the variable displacement pump may be made by means of the control handwheel on the pump.

The Farrel-Birmingham Co., Inc., is located at Ansonia, Conn.

**Loading Side
Acme-Gridley
Chucking
Machine**



The Transformation Of Wool Variables

(Continued from page 377)

influence dye absorption. A color will look different in afternoon light, or on a dull day, from its appearance under a north sky on a clear day.

And, finally, the sensitiveness of the official color perceptor, the dye, is a variable. Every person who has anything to do with color is tested for color blindness. About 8 per cent of men are color blind, while less than 1 per cent of women are thus afflicted. Even those who are considered to have normal color vision do not always see colors exactly alike. We have a real problem on our hands when we are given a standard from an unknown source to match, especially if it happens to be one shade in normal daylight, and a redder shade when viewed under electric lights. If it happens that the colors which we use to match it do not change shade under various changes of light, then if we make our match on a clear bright day, it will not match the changing standard when the customer matches it on a dull day, or under artificial light, and vice versa.

At various stages of manufacture, samples are taken, on which control and check tests are made to assure as great a degree of uniformity as possible, and to catch any variables or errors which may creep in accidentally. After the cloth is finished, numerous check tests are made to make doubly sure that physical and fastness properties are what they should be.

Business Notes

At its annual meeting of stockholders, the Robert Gair Co. announced a dividend payment of 75 cents a share on the company's preferred stock payable March 31 to stockholders of record March 16.

Directors of the Borg-Warner Corp. have announced a quarterly dividend of \$1.25 a share on the preferred stock and 75 cents a share on common stock. Both dividends are payable April 1 to stockholders of record March 13.

Common stock of the Borg-Warner Corp. has been placed on an annual \$3 a share basis by the announcement last week of 75 cent quarterly dividend.

Thompson Products, Inc., have announced a quarterly dividend of \$1.25 a share on the new five per cent preferred stock, payable April 1.

Continental Motors Corp. has announced the sale of its entire stock interest of the Continental-Divco Co., a wholly owned subsidiary. The sale, to be consummated before April 15, will be for a cash consideration.

The elimination of the annual tax on automobiles in Austria has given a strong impetus to the automobile trade and industry in that country. The leading producer, Steyr, is said to be working at full capacity and has under development a new 8 hp. car for which a large demand is expected.

Automotive Industries

XLO HYDRAULIC POWER UNITS pay for themselves many times over!

This fact has been proven in actual experience covering a wide range of installations—both "designed-in" as part of new machines, or as modernizing units on re-designed machines. Compact, rigid, self-contained, they can be mounted in vertical, horizontal, or angular positions. Easily adjusted to requirements of each installation. They provide flexibility; a wide range of operating cycles; and quick, economical change-over from one operation to another. Complete information upon request.



RIGHT: XLO Hydraulic Unit mounted on standard base to which a Fixture sub-base can be attached. This permits the addition or changing of operations with a minimum of space and expense involved.

EX-CELL-O

AIRCRAFT
& TOOL

CORPORATION

DETROIT,
MICHIGAN

March 7, 1936

INTAKE ROAR

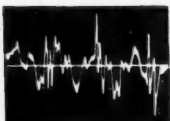


—is
**acoustically
analyzed**
before these silencers
are designed!

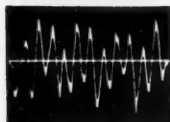
Every type of engine produces an intake roar that possesses distinctive frequency characteristics. Before designing a new silencer, Burgess engineers scientifically analyze the "roar"—then they develop sound-suppression chambers to silence the dominant frequencies.

The leading car manufacturers use Burgess Silencers extensively because they are efficient—yet compact. Let us quote you on your requirements.

Each Silencing Chamber suppresses its quota of noise frequencies!



1 The acoustic dome—lined with Burgess Acoustic Treatment—absorbs extremely high pitched noise. The oscillogram shows the intake roar minus the highest frequencies.



2 The "hiss" chamber, as shown by the oscillogram, takes out the next lower level of high frequencies and thereby further subdues the intake "roar."



3 The next chamber suppresses sounds of about 500 cycles, leaving only the lowest rumbles, as shown by the oscillogram.



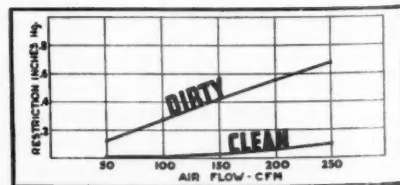
4 The last chamber muffles the deepest sounds of intake roar. The oscillogram shows that practically all "roar" is silenced.

Burgess Battery Co., Acoustic Division
1021 E. Washington Ave., Madison, Wisconsin



BURGESS Air Cleaner has high efficiency

The special honeycomb winding of the oiled copper gimp, used in Burgess Air Cleaners, traps incoming dirt with practically no air restriction. Even when heavily loaded with grit and dirt, the air restriction remains low, as shown by the test curves below. Complete Burgess test data will be sent upon request. Write today!



BURGESS ACOUSTIC

MFRS. OF AIR CLEANERS, INTAKE SILENCERS, BREATHING CAPS, MUFFLERS, STACK SILENCERS, ENGINE HOODS, ACOUSTIC CAB TREATMENT, COMMUNICATION BOOTHS, AND ACOUSTIC DUCT LINING